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COMPUTERWORLD

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IBM expands PS/2 service options but has trouble moving the hardware out the door. Page 12.

Is HDTV an issue for information services professionals? Electronics industry observers say it may be crucial. Page 115.

Downsized Mac II is Apple's answer to the 80286 system, but price is still an issue for some. Page 4.

Hacking haunts FBI as West German arrests prompt embarrassment over inattention to earlier intrusions. Page 140.

Financiers know sharks, but with inadequate backup, they may not be prepared for the type hovering over Atlantic fiber-optic link. Page 55.

IBM lifting curtain on repository project

BY STANLEY GIBSON
CW STAFF

IBM has built the ballpark, laid out the diamond and filled the stands. Now it is trying to get players on the field.

In an unprecedented attempt to guide the destiny of computer-aided software engineering on IBM systems, IBM is setting the stage for an expected summer rollout of its much-anticipated repository. If it lives up to its billing, the repository should permanently change the way many MIS departments and applications developers produce software (see story page 140).

The repository is a sophisticated data dictionary or encyclopedia offering software developers a consistent map of their data. It will also help provide IBM software with a common interface to IBM hardware, a key goal of the company's Systems Application Architecture strategy. The repository should give a powerful boost to SAA because it promises the rapid creation of applications that can run on all SAA platforms, which include most of the IBM product line.

Because it is SAA-compliant, the repository will eventually run with any SAA operating system: MVS, VM, OS/400 or OS/2, said Robert Libutti, IBM programming systems director of market support, in an exclusive interview with *Computerworld*. However, the initial host to be supported will be a 370-architecture mainframe running MVS. OS/400 and OS/2 versions will not be announced this year, he said.

ANDY FREEBERG

IBM's Libutti *sketches out repository blueprint*

The OS/2 version will run on an IBM Personal System/2 acting as a local-area network server, Libutti added.

IBM plans to introduce the repository formally sometime this year, Libutti said. The initial repository announcement will not be a final version, be noted; enhancements will be added to subsequent versions. Although he would not specify a date for the announcement, he indicated it will likely be conducted in concert with a number of independent software vendors that will have their products ready to work with it.

Glover Ferguson, director of development of Arthur Andersen & Co.'s Foundation CASE products, confirmed there is an inner circle and an outer circle of CASE tool vendors. "The specifications will be published, and everyone can play, although some people will be playing already," he said.

"The goal would be to have everybody's favorite tool running in partnership with selected IBM tools for development and maintenance," said Ed Acly, a software analyst at International

Continued on page 141

Lotus' hopes ride on data sharing

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — With beta software in users' hands, Lotus Development Corp. officials last week outlined plans to counter critics by defining a multiplatform strategy for Release 3.0 of its 1-2-3 spreadsheet.

Some users, already smarting from product delays and myriad unmet promises, will be tough to convince, while others plan to leap at the data-sharing scenarios Lotus will describe.

Part of Lotus' pitch will be to give meaning to the nebulous term "cooperative processing." For Lotus, it means shipping the same spreadsheet for a variety of architectures that can dynamically share data.

The firm is counting heavily on what it calls "cooperative spreadsheet processing," a technology that lets two spreadsheet users share data and execute macros interactively on each other's machines.

For example, unlike other data-sharing techniques that involve cumbersome file importing, the Lotus system allows one user to exchange messages and data without storing files or exchanging disks. The project, which is still in development, was demonstrated to *Computerworld* last week.

Lotus officials used Release 3.0 under MS-DOS and two personal computers hooked together via a local-area network. A user who sets the system up to

Continued on page 6

MANAGER'S JOURNAL

MIS education assumes a foreign accent

BY GLENN RIFKIN
CW STAFF

In August, Pradeep Kumar will receive a master's of science degree in MIS from Boston University. Like a full third of the students in the BU program, Kumar came a long way to get his degree. In his case, it was the 11,000 miles from his native Malaysia to Boston.

Kumar represents a growing trend in MIS education in the U.S. MIS programs, particularly at master's and doctoral levels, are increasingly being populated by foreign students.

While the race from abroad to U.S. campuses is nothing new in academia, questions abound about the impact such a trend is having on MIS education. Are U.S. universities seeding the information systems ranks of foreign nations that will compete most ardently with U.S. business in the coming decades?

Gordon Davis, Honeywell Professor of MIS at the University of Minnesota, said a majority of MIS students at the master's and doctoral levels return to their native lands after graduation (see story page 66).

Kumar *and fellow MIS students*

In a sampling of U.S. universities with established MIS programs, the percentage of foreign students generally ranged from 20% to 30% of total enrollment at the master's level. At the Ph.D. level, the numbers tended to be even higher (see chart page 66). At the extreme is BU, where foreign students make up 70% of the Ph.D. program.

Kumar's presence at a U.S. school is hardly

Continued on page 66

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Object orientation can't be pigeonholed. Page 103.

UPDATE

Why not a computer industry veteran for defense secretary? Consider Bobby Ray Inman: For four years, he was the Defense Department's top spy and was deputy director of the CIA. He was also the founding CEO of Microelectronics and Computer Technology Corp., the nation's first high-tech consortium designed to fight Japan, Inc. Today, he's CEO of a defense-related electronics holding firm. He has an excellent reputation in Washington, D.C., enjoys bipartisan support and doesn't have a drinking or womanizing problem. Sounds good.

You can never be too prepared for the possibility of a system disruption. Page 75.

KEVIN POPE

EXECUTIVE BRIEFING

■ **A revolution in software development.** That's how IBM is positioning the repository product it intends to release this year as it tries to assemble an independent show of support, page 1. The technology intrigues users but isn't freezing their plans to develop their own repositories. CASE vendors stand to benefit most, while independent DBMS makers will be the big losers. Look on page 140 for a plain English explanation of what a repository is.

■ **PCs aren't the big issue anymore.** They've been replaced by the broader notion of end-user computing. And today's savvy IS managers are building their long-range strategic plans with the widespread use of PCs as one of many factors in the end-user equation. Page 95.

■ **Diversification could help Eastern Airlines' MIS** subsidiary weather the carrier's stormy bankruptcy. The System One operation has been adding smaller clients and still has Continental to fall back on, but restructuring is likely. Page 6.

■ **More of your employees** may come from foreign countries in the future if trends in IS education continue. Up to 70% of the students in some graduate-level MIS programs hail from overseas, with the Pacific Rim by far the leading supplier. Page 1.

■ **A nationwide shortage of PS/2s** has users waiting up to three months for Models 25, 70 and 80. IBM hopes to have the problems fixed by July, page 12. Users now have more options for PS/2 service under an IBM plan that bestows more responsibility on dealers, page 12.

■ **High-level MIS shuffling** at three major firms: Patrick Manning, who headed Pennzoil's Stratis MIS spinoff, resigns at 52 and won't be replaced. Aetna hires John Loewenberg from competitor Capital Holding to head s reorganized IS operation and succeed the retiring Irwin Sitkin, page 8. Meanwhile, Bank of America hires a 30-year IBM veteran to take over its core data center, page 8.

■ **Dow Chemical's IS chief** merges business and technology by hiring creative staffers, enlightening his management and harnessing the company's power users. Now, Hans Huppertz is tackling his biggest challenge yet: creating s global information network. Page 63.

■ **Using common sense saves money** for these users: Arco cuts staff of tape librarians by two-thirds by simply reorganizing tape library floor layout, page 29. Some users are finding that the plunge in System/36 prices makes the machine an inexpensive way to get smaller projects done, page 27.

■ **The FBI is taking computer crime** more seriously following the arrest of s gang of hackers in West Germany earlier this month. Critics say the magnitude of the crime has shocked the feds into action. Page 140.

■ **The desktop decision gets cloudier** as OS/2 faces s double squeeze from more flexible versions of Unix on one end and an improved version of Microsoft Windows on the other, page 39. Meanwhile, software coprocessors that let DOS software run under Unix are making what was once an expensive hardware investment into s no-brainer. Page 54.

■ **There's an opportunity for buyers** in DEC and DG's belated entrance into the workstation market. Eager to make a splash, the mini makers are driving price/performance levels to new records. Page 27.

■ **Sharks could spoil potential** of a transatlantic digital communications cable. The fiber-optic link has advantages over satellites, but there's no backup if the line is severed, page 55.

■ **Demand for IS professionals strengthens** on Wall Street, despite its unstable image. But firms today are looking more for practical experience and less for exotic technologies. Page 121.

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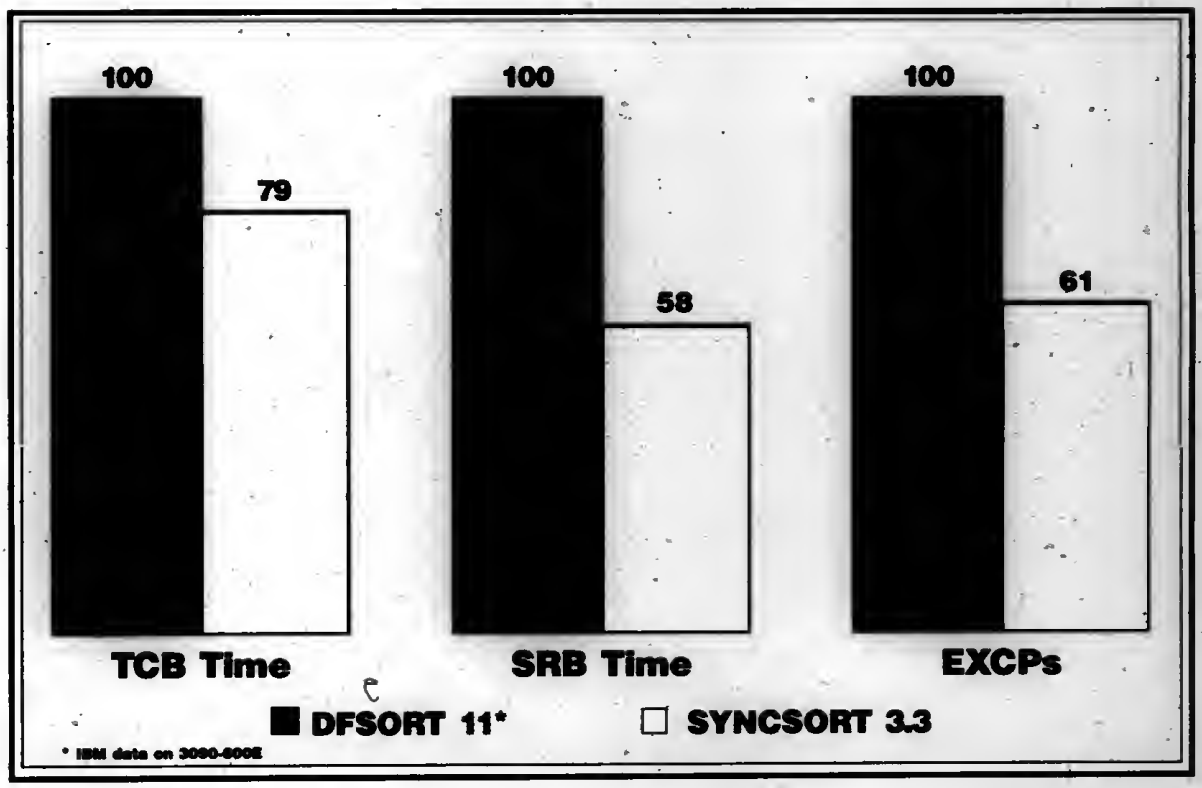

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Where Performance Is the Issue.

Users laud Mac IICX but lament price tag

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Users have greeted Apple Computer, Inc.'s latest attempt to plug holes in its line of Macintosh personal computers favorably. However, Mac technology still comes at a premium when compared with MS-DOS-based systems, users noted.

Much of the appeal of the system announced last week is its smaller footprint, users said. The Motorola, Inc. 68030-based Macintosh IICX offers three expansion slots, compared with six in the original Macintosh II. As a result, it is more streamlined than the other models in the Mac II line.

"It's a nice, in-between kind of product," said Mary Howlett, manager of office automation systems at Hughes Aircraft Co.'s Ground Systems Group. "But I'm disappointed in the price; I had hoped it would be a little lower."

Apple Chairman and Chief Executive Officer John Sculley said the new system is an attempt to provide Apple with a midrange offering, the area in which Intel Corp. 80286-based PCs — IBM Personal Computer AT's and clones of that system — have become popular.

According to Dataquest, Inc., a San Jose, Calif.-based market research firm, 6.5 million 286-based systems will be shipped this year, accounting for the bulk of sales in the personal computer market.

"While we've been doing very well on the high end, it's not the largest segment of the market," Sculley conceded.

Price drop

PC AT compatibles are currently selling in the $2,000 range; prices are expected to drop to between $1,000 and $1,500 during the next couple of months because of oversupply. However, a base configuration of the Mac IICX is priced at $4,669.

For that money, users reported that they obtain features not available in the standard clone — in particular, the benefits of the Mac's graphical user interface. With the Mac IICX, Apple will introduce its portrait screen, a full-screen high-resolution display.

Users said that features such as the display and the promise of enhancements to the popular Mac operating system will motivate them to pay the higher price.

Apple is expected to release a multitasking version of its operating system before the end of 1989.

"We'll probably buy it," Howlett said. "You get quite a bit with a Mac — things like Appletalk."

"It's a winner," said Mike Bailey, a systems integrator at Lockheed Missiles & Space Co. and president of the Apple Professionals Exchange. "I'm going to have one. It'll fit a lot of our needs here, especially the new screen and the footprint."

Monitors also debut

Apple also announced two monitors. One is a 21-in., two-page monochrome monitor capable of displaying two letter-size pages side by side. The price of that display, currently available, is $2,149.

The Portrait Display is a 15-in.-diagonal flat screen able to replicate a full page. It is priced at $1,099 and will be available in May, according to an Apple spokesman. Video cards for both monitors are priced at $599.

The Mac IICX can also be purchased with a standard Apple monitor.

Bridging two worlds

The Macintosh IICX is sized closer to the Macintosh Plus and Macintosh SE models, while offering the modularity and flexibility of the Macintosh II series

Model	Motorola processor	Memory (megabytes)	Footprint (sq in.)	Base price
Macintosh Plus	68000 7.8 MHz	1-4	104.6	$1,799
Macintosh SE	68000 7.8 MHz	1-4	104.6	$3,169
Macintosh SE/30	68030 15.7 MHz	1-8	104.6	$4,369
Macintosh IICX	68030 15.7 MHz	1-8	177.6	$4,669
Macintosh II	68020 15.7 MHz	1-8	264.6	$4,869
Macintosh IIX	68030 15.7 MHz	1-8	264.6	$5,269

SOURCE: APPLE COMPUTER, INC.
CW CHART: JOHN YORK

SAA interface to take OSI turn

BY ELISABETH HORWITT
CW STAFF

IBM recently put some beef into its commitment to integrate networking standards under its Systems Application Architecture (SAA) umbrella by adding an OSI twist to its distributed processing strategy. But there are a few gaps to fill and a few independent vendors to woo before users can start lining up to buy real products.

Last month, IBM told a group of consultants that it plans to provide Open Systems Interconnect (OSI) support for its Common Programming Interface for Communications. The current interface is a consistent set of commands for invoking LU6.2 network functions, which provide "source-code portability" for applications across all four SAA environments: MVS, VM, Application System/400 and OS/2 Extended Edition, according to IBM OSI Systems Manager Donald Holtz.

By writing to the interface, a developer can implement one half of an application on an SAA "front end," such as a Personal System/2, and the other half on a "back end," such as an AS/400, and have the two communicate via LU6.2, Holtz said. The user could also migrate either half of the application to another system — from an AS/400 to a 370, for example — without having to rewrite the interface, be added.

Extending the communications interface to support OSI would effectively create an IBM-blessed software interface for writing applications that combine IBM and non-IBM systems.

On one hand, IBM may have some trouble generating support among other systems vendors and independent software houses, given that its new interface already has several rivals, including the existing LU6.2 Advanced Program-to-Program Communications (APPC) protocols, noted David Passmore, a partner at Ernst & Whinney subsidiary Network Strategies, Inc.

APPC is reportedly more difficult to work with than the new interface — roughly analogous to assembler vs. Cobol, Holtz said — and requires the programmer to learn a new set of commands for each type of IBM system. But at least APPC is available now for all SAA systems. To date, the Common Programming Interface for Communications only supports VM/SP Release 6, with no release date for the other versions.

On the other hand, the new interface may well be a must for any firm that "wants to be considered a serious IBM player," said Joseph Clabby, communications marketing manager at Data General Corp. Last week, DG became the first major vendor to announce support for the interface, which provides what APPC was supposed to provide — "a more or less standard platform that would allow us to tie into disparate IBM systems," Clabby claimed.

IBM's decision to provide OSI support for the interface is great, Clabby added, because "it allows our OSI products to talk to their OSI, as well as our SNA to their SNA."

'Kosher' connections

Flexlink International Corp. is another company that plans to support IBM's interface. The Seattle vendor sells software to link IBM, Digital Equipment Corp. and Sun Microsystems, Inc. systems and will soon support both OSI and LU6.2, said Flexlink director of technical marketing Gregory Brown. Customers may demand support of IBM's interface as "the kosher way" to SAA compatibility, Brown said.

One such customer may well be Chevron Corp., which currently has "no elegant way" to link its DEC and IBM systems, according to Stephen White, supervisor of communications at Chevron Information Technology Co. While the company had initially passed over Flexlink, it may reconsider because of Flexlink's ability to support strategic protocols such as OSI and IBM's common programming interface, White said.

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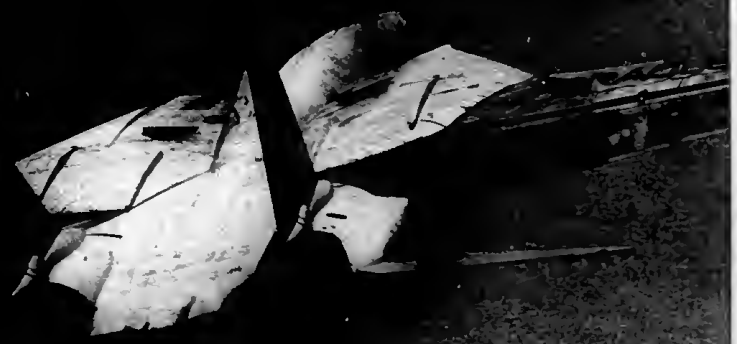

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	Los Angeles	Mar 14fm Apr 20af
		Apr 25g
	Ontario	Mar 21fm
	Redwood City	Apr 27g
	Sacramento	Mar 21f
	San Diego	Mar 16cf
	San Francisco	Mar 29cf Apr 25ar
	San Jose	Mar 9fi Apr 12ar
	Santa Clara	Mar 9fi
	Universal City	Apr 6cfm
CO	Denver	Mar 30g
	Englewood	Mar 7afp Apr 18ac
CT	Farmington	Mar 7f
	Stamford	Mar 21fm
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	Tampa	Mar 22fi
GA	Atlanta	Mar 23r Apr 26em
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IL	Chicago	Mar 21fi Apr 18afp
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MA	Boston	Apr 20fm
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ME	Augusta	Apr 18t
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COMPUTERWORLD

Microsoft delays downplayed

BY PATRICK WAURZYNIAK
CW STAFF

REDMOND, Wash. — Microsoft Corp.'s uncharacteristic stumble last week, announcing delays on key products, sent shock waves through Wall Street but seemed to cause little concern among users waiting for updates of Word for IBM Personal Computers and Apple Computer, Inc. Macintoshes by April.

Microsoft said that shipments of the updated word processor programs — Microsoft Word 4.0 for the Macintosh and Microsoft Word 5.0 for the PC — will be delayed until next month.

The firm had promised the upgrades by the end of 1988, later revising that to March, but it underestimated the time needed for debugging and performance testing of the products, said Jeff Raikes, general manager of Microsoft's office business unit.

"We needed the release date to be later than our [hardware] procurement cycle, so it worked to our advantage," said Camille Intagliata, manager of the information center at Chicago-based Homart Development Co., a real estate development subsidiary of Coldwell Banker Real Estate Group, Inc. Homart, which is now converting terminal users from its former Sperry Corp. 1100 mainframe to PCs, has standardized on the Microsoft Word package and plans to double its installed base of 150 PCs.

"Like everyone, [we are] concerned with delays," Intagliata said. "Anytime you hear of a delay you're concerned, but delays often mean less bugs." Intagliata said she has tested a beta version of 5.0, and likes the package's improved graphics and laser printer capabilities.

Slow to jump

"As far as 4.0 goes, we wouldn't be jumping to that right away," said Doug Scott, an attorney for Fasken & Calvin, a Toronto-based law firm with 220 Macintosh systems running the earlier version of Word. "It's not going to trouble me if we don't get 4.0 until three months from now."

Microsoft also admitted it has run out of stock worldwide on both current versions of the Word product line, Microsoft's largest-selling application; the firm has no plans to restock the old versions.

Fasken & Calvin has been beta-testing the Word 4.0 Macintosh update, and Scott's main concern is how much memory the Mac upgrade uses. Microsoft has assured the firm that the new version requires only 512K bytes of memory.

After the disclosure, Microsoft's stock tumbled $8.50 to $53.50 per share in trading on the NASDAQ stock exchange. The company's third-quarter revenue projections — between $180 million and $200 million — exceed the $168 million in sales for last year's third quarter but fall short of the $215 million projected by most market analysts.

The firm also attributed its lowered revenue expectations to the fact that several of its largest distributors and resellers are overstocked. The company added that these customers appear to be reducing inventories.

Microsoft's misfortune should only be temporary for the industry's leading supplier of PC software, but the firm will not bounce back immediately, said Alex Brown & Sons, Inc. analyst W. Christopher Mortenson.

Glaring glitches

"The real issue was that Microsoft was experiencing a slowdown," Mortenson said. "There were few new applications available to sell, so any kind of a glitch was more noticeable."

Meanwhile, Ashton-Tate Corp. reported higher earnings and revenue in its fiscal year-end results for the period ended Jan. 31. Its earnings rose 10.7% to $47.8 million, or $1.83 per share, up from $43.1 million, or $1.70 per share, a year ago.

Ashton-Tate showed a 15% increase in year-end sales with revenue reaching $307.3 million, up from $267.3 million last year. For the fourth quarter, it reported earnings of $13.4 million, or 51 cents per share, up from $12.8 million, or 50 cents per share, for the fourth quarter in 1988.

Eastern-linked System One has own flight path

BY DOUGLAS BARNEY
and WILLIAM BRANDEL
CW STAFF

HOUSTON — The strike last week that paralyzed Eastern Airlines, forced the layoffs of some 5,000 employees and pushed the carrier into Chapter 11, may next rock the firm's data processing operations.

Although the 3,400 employees at Eastern and Texas Air DP subsidiary System One Corp. are not unionized, the turmoil could cause layoffs and restructuring. Because of diversification, however, System One could weather even the fiercest storm without crashing, one official noted.

Likely scenarios, according to analysts and employees, are liquidation, the sale of Eastern to another airline such as TWA or an eventual settlement. Meanwhile, the employees can only wait and see what happens next in this fast-moving corporate saga.

System One was formed as a "self-sufficient profit center" after the 1986 merger of Eastern and Texas Air. Since its founding, the firm has diversified into supporting smaller carriers and has a stake in the European transportation market, pointed out a senior-level MIS official who asked not to be named.

System One also supports Continental, a nonunion airline owned by Texas Air that so far has not been affected by the strike. This has not soothed the System One employees who survived January layoffs of 350 workers, which many claim were in preparation for an expected strike.

Always nervous

"You always have to be nervous," noted one senior programmer, who worries that if Eastern is sold to another carrier, its reservation system will no longer be required. The programmer said he is grateful for the high degree of technical training most System One employees have. "If something happens, we can get another job."

System One had been on a roll until the Eastern labor dispute reared its head some 17 months ago. It had invested hundreds of millions of dollars in technology and manpower to grab a slice of the transportation information systems market. Even after the layoffs early this year, System One has 1,000 more employees than it had when it was founded.

While the headlines rage, company officials simply attempt to calm employees' nerves. "We are telling our employees that it is business as usual at System One," said System One spokeswoman Charlotte Kirk.

Lotus

FROM PAGE 1

listen can receive data or live-active spreadsheet models that can be modified, annotated and sent back. Control can be toggled back and forth between users.

This system, demonstrated last week, is expected to be released as a Value Pak for Lotus Extended Application Facility customers later this year, officials said.

This capability will eventually be extended to every key architecture that Lotus will support, said Christine M. O'Connor, general manager of the systems technology group at Lotus.

According to Lotus Chairman Jim P. Manzi, it will be this type of integration, rather than the spiffy graphical user interface strategy pushed by Microsoft Corp., that will define his firm's spreadsheet product line.

Like many other users, Fidelity Investments Vice-President of Technology Services Frank Diasparra argued that Lotus has yet to establish credibility. This may be less of a problem when the firm's product dry spell ends. Company officials promised that some 12 new applications will ship this year. Manzi himself pledged that by year's end, Lotus will be a "software factory."

Manzi *says integration is key*

The cooperative spreadsheet approach clearly carries risk. While some users are anxious to implement the technology, others believe the firm should be more sharply focused on PCs.

Otto Eisele, who manages about 1,400 PCs largely equipped with 1-2-3 at Union Carbide Corp.'s office technology division, said he was impressed with the spreadsheet-sharing project. "There is a lot of appeal. It would be neat to work with someone on their spreadsheet. I could help them debug their macros," he said.

However, Fidelity's Diasparra, a former 1-2-3 user, said he was utterly unimpressed, claiming he already has that ability with the Dynamic Data Exchange Protocol in Microsoft's Windows. "I already have spreadsheets that share data on a real-time basis," Diasparra said.

In an interview last week, Lotus Senior Vice-President Frank King also touted the potential of 1-2-3/M, an often-criticized and still unshipped spreadsheet for IBM mainframes that will share the same spreadsheet engine that drives the upcoming Release 3.0 PC product.

This version has extra code to attach to IBM mainframe services, such as communications, and will ultimately allow 1-2-3/M to access IBM's DB2. "Our view of mainframes is that they are spreadsheet servers," Manzi explained.

That interpretation was both embraced and scoffed at by users. Lotus is getting out of its league with a mainframe product, one user argued. "Most things you do on spreadsheets should not be done anywhere near a mainframe," Eisele said. "Lotus should stick to the girl they came to the dance with."

This product could help Big Eight accounting firm Touche Ross & Co. "In the large environment, you will see a marriage between PC and mainframe products," said G. Jeffrey Knepper, the firm's director of advanced technology-tax.

Knepper has dealt with the awkward procedures required to move data from a host to a PC. Even worse, after extracting the information, translating or repackaging it and moving it to the PC, it is almost impossible to put back. The common file formats of Lotus 1-2-3/M could change all that, Knepper said.

Lotus' King *promotes 1-2-3/M*

PHOTOS BY JOHN OPEL

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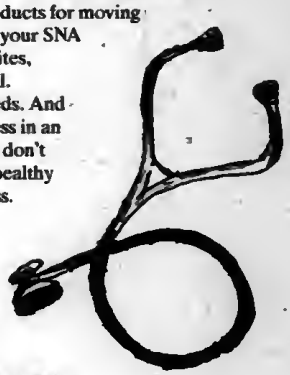

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8:30 a.m.	Registration and Coffee
9:00 a.m.	Seminar Begins
12:30 p.m.	Complimentary Lunch

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NEWS SHORTS

No IS impact so far in media merger

The planned merger of Time, Inc. and Warner Communications, Inc. may change the media world, but it is not expected to affect computer operations immediately. Both companies have highly decentralized organizations, and systems are run and managed separately for their businesses. One Warner employee who asked to remain anonymous said because the possible merger is months away, systems workers have not yet been briefed. "It would be premature to speculate," the employee said.

Tandem hit with monopoly charges

Neptune Computer Holding Ltd. has reportedly charged Tandem Computers, Inc. and its Australian, Canadian and British subsidiaries with five counts of monopoly and wrongful trade practices, including breach of an April 1988 antitrust settlement. A lawsuit filed without fanfare in New York last December claims Tandem is unfairly competing for business with its aftermarket dealers by warning potential customers that it cannot guarantee the same level of maintenance support for used Tandem computers as for new ones. Tandem, which has formally denied all charges in its legal reply, "will vigorously defend itself in court," a company spokesman said. If Tandem prevails, the precedent "would be devastating to resellers, and even more so to their customers," said Linda Hopp, a marketing representitive for Fairfield, Conn.-based Computer Resale, Inc.

Accunet hooks into Bell Atlantic

AT&T has begun connecting its interstate packet network, Accunet, to Bell Atlantic Corp.'s local packet network, Bell Atlantic announced last week. As a result, Accunet customers will be able to transmit data within the mid-Atlantic region, while Bell Atlantic customers will be able to transmit data packets to other states and countries via Accunet. AT&T also is negotiating for connections to the local packet networks of other regional holding companies.

Cuts at Northern Telecom unit

Bell Northern Research (BNR), a subsidiary of Northern Telecom, Inc., has eliminated 50 positions among its 500-member work force. The downsizing is a continuation of an overall corporate restructuring announced by Northern Telecom in December, said BNR spokesman Brian Fraser. At that time, the private branch exchange vendor detailed a $200 million write-down that would result from the belt-tightening effort, which was expected to affect as many as 2,500 employees, according to spokesman Michael Gage. Fifty employees are on a paid leave of absence until March 19, while the company tries to find them other internal positions. After Friday, employees who have not been placed will receive severance packages and job counseling, Fraser said.

NCR repackages OS/2

NCR Corp. claimed last week to be the first vendor other than IBM to ship its own version of Microsoft Corp.'s OS/2 1.1, the operating system with the Presentation Manager user environment. NCR priced its version at $340.

Amex data group buys unit

Data Based Service Group of American Express, the data processing arm of American Express Co., announced last week its intent to purchase the domestic mutual funds transfer agency business of The Boston Co. for $275 million. The Boston Co.'s mutual funds transfer agency business serves 4.8 million accounts, most of which are associated with Shearson Lehman Hutton (SLH) Holdings, Inc.; American Express owns 62% of the outstanding shares of SLH Holdings, and The Boston Co. is a wholly owned subsidiary of that firm. American Express spokesman Matthew Stover said the purchase will essentially take "a data processing function that has been at an asset management company and put it over with the data processing folk, where it more logically belongs."

IS execs depart Aetna, Pennzoil

BY CLINTON WILDER
CW STAFF

Top IS executives Irwin J. Sitkin at Aetna Life & Casualty and Patrick L. Manning at Pennzoil Co. have announced their departures — Sitkin by retirement and Manning by unexpected resignation.

Pennzoil confirmed last week that Manning, president of

Manning

Pennzoil's Strategic Information Services Co. (Stratis) and a member of the firm's operating committee, has left the company and will not be replaced. The Houston-based oil firm's top IS executive is now Keith Eaton, executive vice-president of Stratis, who reports to Clifton H. Fridge, senior vice-president of accounting and controller. Eaton formerly reported to Manning.

Manning, 51, headed Pennzoil's four-year, $50 million strategy to revamp its nationwide data network and spin off Stratis, an independent business selling software and services [CW, Jan. 25, 1988]. Pennzoil spokesman Bob Harper said Manning's departure was not related to any performance criteria for Stratis. "Pat just chose to resign to pursue other interests," he said.

Manning could not be reached for comment. Sources close to the company said he plans to continue his IS career elsewhere.

Eaton, another former Kerr-McGee IS employee, joined Pennzoil in 1986 as director of MIS and user support services. He was promoted to vice-president of MIS in 1987.

Aetna turned to a competitor in the insurance industry for Sitkin's replacement. John D. Loewenberg, formerly the top IS executive at Louisville, Ky.-based Capital Holding Corp., begins work today in the new position of senior vice-president, corporate information systems, at the $22 billion Hartford, Conn.-based insurance giant. He reports to Aetna Chairman James T. Lynn.

Loewenberg's hiring coincides with a reorganization of top-level IS management at Aetna. He will head a new corporate IS department comprising three functions that had been grouped under Sitkin's domain, corporate

Pennzoil's Eaton

administration. The functions are corporate technology planning, technology services and applications systems services.

Sitkin will retire June 30 and continue as an Aetna consultant for an unspecified time. A 35-year Aetna veteran, Sitkin downplayed the significance of his retirement and Aetna's IS reorganization. His retirement "has been in the works for some time, really since 1985," he said. "There's no big purge here."

Bank of America snags IS manager from IBM

BY PATRICK WAURZYNIAK
CW STAFF

SAN FRANCISCO — Bank of America last week named a 30-year IBM information management veteran to head up the San Francisco data center that runs the bank's automated teller, check-processing and other computer-based services.

The bank named Ray O. Vander Vliet as managing director of its data center, which is located in the heart of San Francisco's financial district. The center is responsible for operating Bank of America's Versateller ATM system throughout northern California and also supports the bank's wholesale banking services in the U.S. market.

Earlier in his IBM career, Vander Vliet had been one of the three original designers of CICS for IBM while at an IBM development center in Des Plaines, Ill. He later transferred to Palo Alto, Calif., where he was the senior programmer manager responsible for CICS and IMS worldwide revenue, development and maintenance, before moving to IBM's Tucson, Ariz., site.

Vander Vliet will report to Didier Milhaud, Bank of America's senior vice-president and chief of operations for the systems engineering department.

At Bank of America, Vander Vliet said the top priority is to stabilise and implement all of the bank's computer services to ensure that the applications that serve customers are available to them. Vander Vliet said his "main mission is to ensure that those services are the best in the banking industry."

Vander Vliet, who joined IBM three years after starting in data processing in 1956 in the U.S. Air Force, most recently ran the information systems department at IBM's Tucson site, which he helped set up in 1978.

Until taking IBM's offer of early retirement last month, Vander Vliet had been IBM's functional information systems manager in Tucson.

Plexus scraps supermicros, idles 150

BY J. A. SAVAGE
CW STAFF

SAN JOSE, Calif. — The Queen of England got one of the last of Plexus Computers, Inc.'s image processing systems.

As of last week, the private company is no longer manufacturing its Unix-based supermicro computers and integrating its applications development software and relational database to a complete image processing system. It also laid off 150 employees, leaving only 50, primarily in the software area.

Although the firm just won several bids, including the pharmaceutical companies Merck & Co., Schering-Plough Corp. and Glaxo, Inc. as well as the U.S. Secret Service, "at this time, we don't know how to fill those orders," a Plexus spokesman said.

Buckingham Palace installed a Plexus system in February for correspondence.

A slew of venture capitalists that have been supporting the company since it was founded in 1980, including Hambrecht & Quist, Inc. and Shearson Lehman Hutton, Inc., notified Plexus that they would not put any more money into it. "It's now funded from accounts payable," the spokesman said.

That money is intended to keep Plexus' core software developers working.

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2 DATAPRO survey for database companies with sales greater than $10 million, 8/88.
3 Stand alone version licensed for developers only. Requires Macintosh SE or II with 2 Megabytes of RAM, 5 Megabytes hard disk space, floppy disk drive, and HyperCard 1.2. Includes 30-day installation support. ORACLE database, Hyper*SQL (HyperCard interface), SQL*Plus, OCI and Pro*C (Macintosh Programmer's Workshop is required for programming usage), System Stacks and Example Stacks. $299 after 5/31/89.
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Amdahl combines transmissions on T1

BY J. A. SAVAGE
CW STAFF

SUNNYVALE, Calif. — Amdahl Corp. last week became the latest vendor to support circuit- and packet-switching transmissions over the same line, providing integration and common network management for its existing T1 multiplexer and packet-switched offerings.

Amdahl's Resource Processor, its T1 transmission product, can now accept packetized transmissions from its Access Processor, a CCITT X.25 packet assembler/disassembler. Because the Resource Processor supports subrate digital multiplexing, it can allocate some bandwidths to both circuit- and packet-switched transmissions within a single 64K bit/sec. channel, according to Amdahl spokesman Larry Fillmer.

Amdahl plans to enhance the Resource Processor with additional capabilities such as support of 45M bit/sec. T3 links and future broadband offerings of Integrated Services Digital Network, Fillmer said. Users can also reconfigure one node without having to take the network down, and that node will update the others, he added.

Two network management systems were also announced: an IBM Personal Computer AT-based product for comparatively small networks and a more sophisticated version based on a Sun Microsystems, Inc. workstation. Both systems can collect traffic and error statistics from either the Access Processor or Resource Processor.

The products are slated for availability in the fall. The management systems range in price from $2,000 to $27,000. The Access Processor is priced at $8,000, and the Resource Processor costs $17,600.

Interface '89 ignites net-linking arena

BY ELISABETH HORWITT
CW STAFF

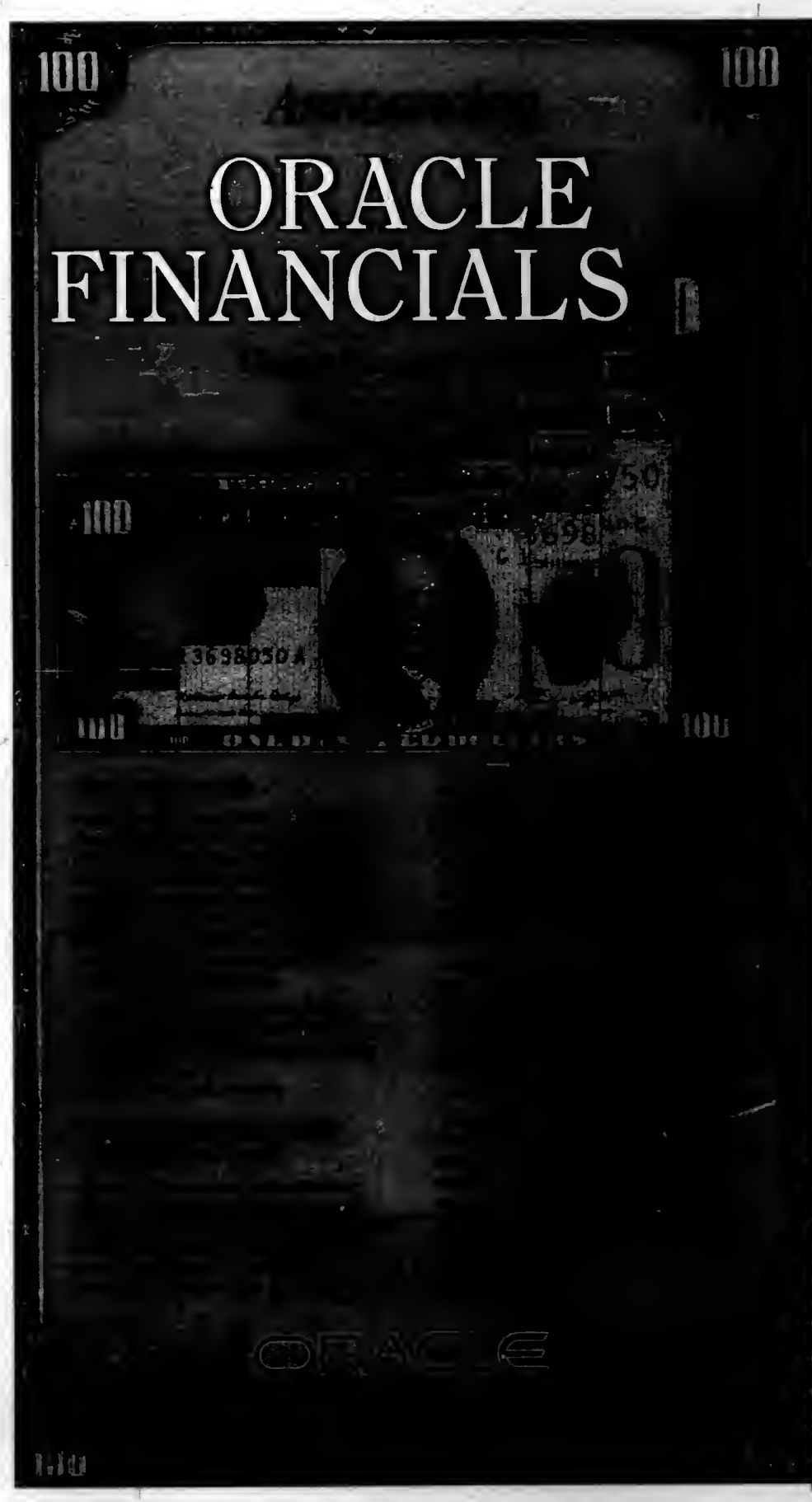
NEW YORK — The network interconnectivity arena that was warmed up at the Communication Networks '89 Conference and Exposition got hotter when Digital Equipment Corp. joined the fray earlier this month and is scheduled to burst into flames at this week's Interface '89 show with at least five introductions. These include the following:

- In-Net Corp. will announce Fibertalk 5000, a series of bridges that are said to allow users to link their existing Token-Ring and Ethernet local-area networks to In-Net's 100M bit/sec. Fiber Distributed Data Interface (FDDI) network. Both bridges are priced at $22,000.

New introductions and falling prices should help the market for high-speed fiber LANs, such as FDDI, soar from $10.7 million this year to $126.5 million in 1993, according to Kessler Marketing Intelligence in Newport, R.I.

- Infotron Systems Corp.'s LAN systems division will announce a CCITT X.25 module for its Commix.32 LAN/WAN server, which is said to allow LAN users to send over a packet-switched network. The module also interfaces with Streamline 25, another Infotron introduction, which is said to support both packet- and circuit-switched transmissions over a single 64K bit/sec. line, with T1 support slated for later this year, Infotron said. Some channels in the link could thus be designated for voice traffic, while others could carry LAN traffic. Streamline 25 prices begin at $15,000.
- Halley Systems, Inc. will announce Connectlan 210, a bridge-router that is said to perform the translation necessary to connect IBM 802.5 Token-Ring LANs with Token-Ring products from 3Com Corp., Novell, Inc. and others. Priced at $12,995, the bridge supports local inter-LAN connections now, with a remote version to come.
- Advanced Computer Communications, Inc. will announce software for its ACS 4100 bridge-router platform, which is said to provide intelligent routing of DEC Decnet and Transmission Control Protocol/Internet Protocol transmissions between Token-Ring networks and transparent bridging for other protocols.
- BICC Data Networks Ltd. will announce a local 802.3 Ethernet bridge, to be priced at $7,500, and a network management system for the product, priced at $5,595.

Also at the conference, NCR Comten, Inc. is expected to introduce a modular IBM communications processor platform that will provide users with on-site upgradability without the need to trade in hardware or interrupt network operations, a company spokeswoman said. Migration on Comten's current line preserves software and some termination equipment but forces users to purchase a new main processor that is "almost like buying a new system" and requires taking the network down for at least a day, the spokeswoman said.



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COMPUTERWORLD

IBM primary provider plan to smooth dealers' feathers

BY ROSEMARY HAMILTON
CW STAFF

IBM tried to kill three birds with one stone last week with its announcement that Personal System/2 resellers will now act as primary providers of maintenance service.

The move should appease dealers and resellers, many of whom said they are fed up with having to compete with IBM for microcomputer service business. Also, it should make customers happier by simplifying their service contract decisions now that IBM is directing them to its business partners as primary providers.

Lastly, it should help push PS/2 sales along by giving customers a complete package of systems and services — something competitors do not offer, IBM claimed.

Customers, however, will still have the choice of contracting with either party as before. Large customer sites, particularly those already using an IBM maintenance contract, can stick with IBM.

What is different is that dealers and resellers can now offer more service than before. IBM-designated business partners can now resell IBM service contracts to customers.

The plan calls for dealers and resellers to buy service contracts from IBM at an average discount of 25% and then resell them to customers at a higher price. IBM said designated dealers can mix their own service offerings with the IBM service offerings. Business partners will serve as the primary contact for service, but an IBM field engineer will make any service calls required.

Under the service plan, IBM will offer on-site assistance as needed to business partners. For the first time, IBM will provide parts on an emergency basis to dealers and resellers.

Jack Cooper, president of CSX Technology, the MIS arm of CSX Corp., said he will consider dealers as service providers for the first time.

Under the previous structure, dealers simply could not compete with the service offerings IBM could provide, according to Cooper. Now, with the additional assistance from IBM, the dealers could come out ahead of IBM if they offer a better price, he added.

PS/2 shortage seen through second quarter

BY WILLIAM BRANDEL
CW STAFF

If you can get your hands on an IBM Personal System/2, grab it. This is the advice of computer dealers that are now contending with a severe shortage of PS/2 models.

"It is a serious situation," said John Hahn, product-line director at Businessland, Inc. in San Jose, Calif. "It is forcing us to defer deliveries to other dealers. We have some accounts that want the PS/2 very quickly, and we do not have any indication from IBM when the supply will be freed."

Businessland has been terminated as a distributor of systems from Compaq Computer Corp., the vendor of the other major personal computer most often made a standard at corporate information systems sites.

Hahn said the shortage began almost eight weeks ago, but the pinch became critical in the last four to six weeks. PS/2 Models 25, 70 and 80 have been hardest hit by the shortage, Hahn said, adding that supplies of other versions of the PS/2 are restricted as well.

An IBM spokesman denied that the shortage is affecting all PS/2 models but admitted that there were "pockets of demand" for the Model 80-111, Model 70-A21 and the Model 25. "All other models are shipping in adequate supply. We hope to resolve the imbalance by the end of the second quarter," the spokesman said.

But customers may be waiting as long as three months for the crisis to be resolved, said John Dunkle, vice-president of Work Group Technology, located in Hampton, N.H. Dunkle said that IBM is suffering from dynamic random-access memory (DRAM) manufacturing problems, estimating that IBM has a nationwide PS/2 order backlog of 50,000.

The IBM spokesman said he was not aware of any current shortage of DRAM supplies and could not comment on how many orders were not being met.

Joe Ann Stahl, president of Storeboard, Inc., said the shortage hit just when IBM was matching Compaq, the consistent market leader in sales of Intel Corp. 80386-based systems. In December, IBM gained 37.7% of the 386 retail market, according to Storeboard, while Compaq grabbed 39.6% of the market. In January, just as the shortage began to take its toll, IBM fell to a 26.2% share, while Compaq surged to 49.1%.

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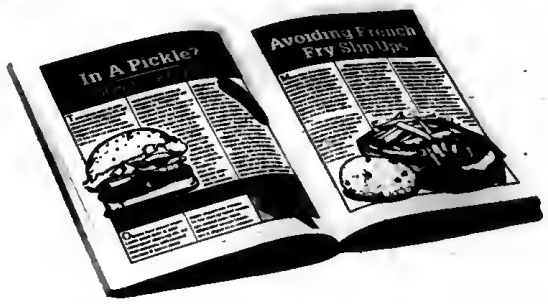

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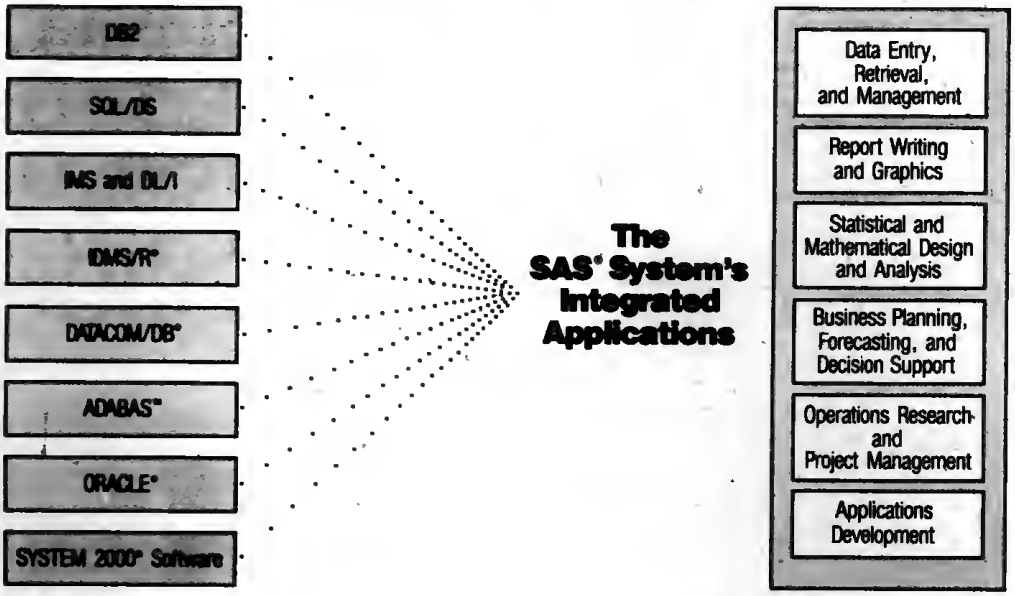

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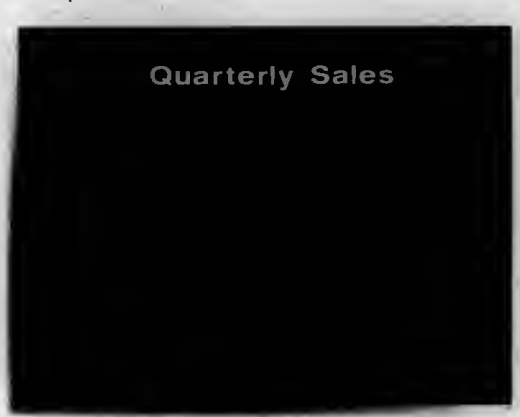

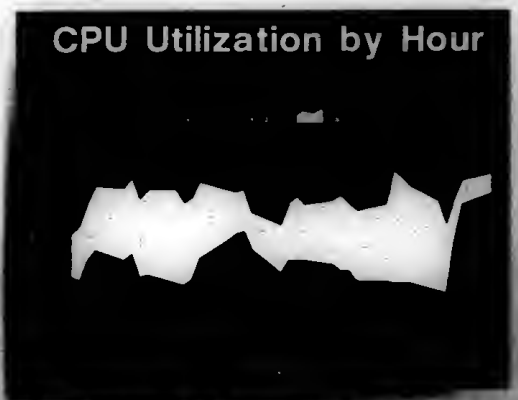

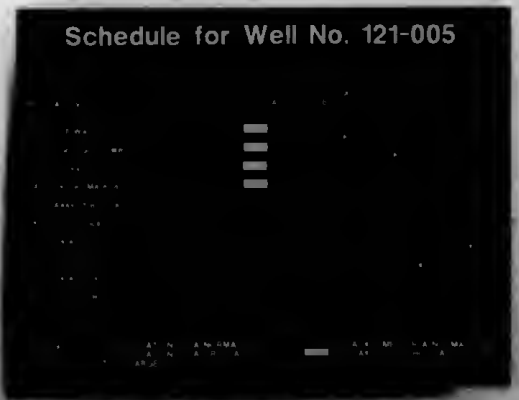

Cray machines cited in Japan scandal

BY LORI VALIGRA
IDG NEWS SERVICE

TOKYO — Cray Research, Inc. supercomputers bubbled to the top of the brewing Recruit Cosmos influence peddling scandal here last week.

Cray itself was not implicated, but alleged kickbacks from the resale of Cray systems resulted in the arrest here of Hisashi Shinto, former chairman of Nippon Telegraph & Telephone Corp. (NTT). Shinto resigned as head of the world's richest corporation and Japan's largest telecommunications operator late last year amid allegations he received some $70,000 in the government-rocking stock scandal here.

Shinto's arrest placed NTT at the heart of the scandal and more strongly implied misdeeds by top politicians, including former Prime Minister Yasuhiro Nakasone.

Proceeds from Recruit Cosmos stock, according to Japanese television reports, were actually kickbacks to Shinto for the purchase of two Cray supercomputers.

WIDE WORLD PHOTOS

Former NTT Chairman *Hisashi Shinto is led away by police*

The Crays form the legs of s triangular relationship among Shinto, Nakasone and Hiromasa Ezoe, former chairman of Recruit Co., the parent company of Recruit Cosmos.

According to reports from the prosecutor's office, just prior to NTT's purchase of four Crays — two of which were later resold to Recruit — Nakasone had been under pressure from the U.S. government to increase Japan's procurement of U.S. goods. Nakasone reportedly saved face with the U.S. when Shinto agreed that NTT would buy four Crays. Recruit's Ezoe allegedly met with Shinto twice, once last August and once in September 1987.

The second of those meetings reportedly was to discuss buying two Crays from NTT to support a digital-line service. March 4, Ezoe and Hiroshi Kobayashi, former vice-president of Recruit affiliate First Finance Co., were indicted on suspicion of bribing two former NTT executive directors, also indicted March 4, in exchange for favorable deals with Recruit, a time-sharing company that leases its lines from NTT.

"It was very visible to us that the ultimate recipient would be Recruit," Cray spokesman John Swinson said last week, adding that the company declared the recipient and value of the systems on an export license application. "The question now is, did Recruit get s sweet deal on a supercomputer? And that's purely out of our hands."

U.S. Department of Commerce officials had little to say about Cray's connection to the scandal. "We're not getting excited" over the Recruit scandal, said Ed Leslie, an officer at the department's Japanese Desk. "We're here to promote the sale of U.S. products."

Recruit "is a service bureau that sells computer services to businesses and universities," said Gary Smaby, vice-president of Needham Securities, Inc. in Minneapolis, who has followed Cray for many years. "It seems that the stock scandal is separate from the business operations of Recruit."

Shinto reportedly received the proceeds from 10,000 shares of Recruit Cosmos stock purchased by his former secretary, who transferred $69,231 into Shinto's bank account from sales of the stock after it went public. Tokyo prosecutors concluded the aide, Kozo Murata, purchased the shares for Shinto and arrested both men. Shinto and Murata were both charged with receiving bribes.

The scandal involved sales of prelisted stock in real estate firm Recruit Cosmos by Ezoe. Ezoe allegedly offered officials and company executives stock in Recruit Cosmos before it went public so that they could earn hefty profits by selling the stock when it was issued on the over-the-counter market in October 1986.

In s press conference last week, NTT President Haruo Yamaguchi said, "We are sorry about the problems arising over the arrest of Shinto and Murata. I would like to most sincerely apologize to everyone about the disturbance. Even now, there is nothing wrong with what they did. But I have to admit that it exceeded its bounds."

West Coast Bureau Chief Jean S. Bosman and correspondent J. A. Savage contributed to this report.

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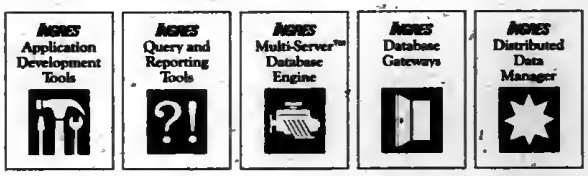

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CW

Modcomp launches midrange lifeboat

BY JAMES DALY
CW STAFF

FORT LAUDERDALE, Fla. — Modcomp kicked in its afterburners in the hotly disputed midrange market last week with the unveiling of high-end additions to its two lines of real-time superminicomputers.

Analysts said powering up Modcomp's 32-bit Tri-Dimensional and 16-bit Classic lines was essential to keep the company from slipping beneath the waves in the turbulent midrange seas. "We're dealing with a 20-year-old company that helped create a market and then essentially fell asleep at the wheel," said Don Bellomy, an analyst at research firm International Data Corp. "They've got to get into a turnaround mode."

In the interim, competitors such as Digital Equipment Corp., Hewlett-Packard Co. and Gould, Inc. have wooed away portions of Modcomp's user base. Although Modcomp received a financial transfusion when it was bought by West German electronics firm Aktiengesellschaft in 1986, it still faces stiff challenges.

One of the key weapons Modcomp hopes to employ in this struggle is its Realix operating system, which melds AT&T Unix System V with its own Max 32 Real-Time Operating System. "If they can make a case for Unix in real time, this puts them in a good position because so much of real time is manufacturing-oriented," Bellomy added.

Three critical areas

The four-model Classic Tri-D 9300 series emphasizes what the firm considers to be the three critical areas of real-time computing: computational power, interrupt handling and I/O throughput.

The machines provide processing speeds of up to 2.5 million instructions per second, can handle 80,000 interrupts per second and boast an I/O throughput of 1.5M byte/sec., the firm said.

While the 9310, 9320, 9330 and 9340 use the same CPU and I/O subsystem, they differ in their number of VME standard bus slots, senior product manager Rick Vesny said. The 9310 offers no VME slots, the 9320 has six, the 9330 has nine, and the 9340 has 20, he added.

Although the single-board computers are currently based on application-specific integrated circuit and complementary metal-oxide semiconductor technologies, Modcomp is looking into future models based on Motorola, Inc.'s 88000 reduced instruction set computing chip, Vice-President of Business Development Dennis Gillespie said.

The Classic III/95 is the latest addition to Modcomp's 16-bit superminicomputer line. It packs 4M bytes of static random-access memory, 8M byte/sec. of I/O throughput and has interrupt handling capabilities of 127,129 interrupts per second. The Classic III/95 runs on the firm's Max IV Real-Time operating system.

Both machines are scheduled to be available in May with prices beginning at $20,000 for the Classic Tri-D 9300 and $91,300 for the Classic III/95.

Tandon grabs clock-speed baton at CeBIT

BY AMIEL KORNEL
IDG NEWS SERVICE

HANNOVER, West Germany — Tandon Computer Corp. proved here last week that it can pump more iron faster than any other kid on the block — for the moment. The U.S. firm chose the opening day of CeBIT '89, the West German computer trade fair, to announce that it will begin shipping the Tandon 386/33 personal computer, which is built around the Intel Corp. 80386 microprocessor running at 33 MHz, in April.

The clock-speed race has become the PC industry's equivalent of Muscle Beach, with vendors flexing their technology in an effort to impress prospective clients. By announcing the 386/33, Tandon stole promotional thunder from the likes of Compaq Computer Corp. and Hewlett-Packard Co. Whether there is end-user demand for desktops using such high clock speeds is another matter, analysts said.

"This will catch people's attention," commented Julia Tweed, PC analyst at market researcher IDC Europa Ltd. in London, "but in terms of end users needing it, I would doubt it. Up to now, the number of 25-MHz shipments and even the number of 386 machines as a whole has been quite low." IDC estimates that only 200,000 systems using the 32-bit Intel processor were shipped in Europe in 1988. That number, however, is expected to more than double this year.

The announcement could position Tandon to get a piece of that growing market. "Tandon hasn't been a leader in the 386 market," Tweed said, "so they no doubt hope that by announcing this machine they can get back in there."

Learning from its past mistakes

IBM WATCH

PAUL KIRVAN

Until recently, IBM's telecommunications strategy has been plagued by a contradiction. The idea of linking heterogeneous products flies in the face of the company's traditional policy of only providing for a single-vendor environment.

This conflict caused users to disregard IBM as a viable telecommunications supplier, until the company awakened five years ago with the purchase of Rolm.

Now that IBM is turning over much of its interest in Rolm to Siemens, users are again adopting a wait-and-see attitude about the viability of IBM's telecommunications commitment.

IBM's current view of telecommunications is far different from that of the past, despite the appearance of giving up its efforts by selling part of Rolm. IBM now recognizes that MIS lives in a multivendor world and that managers need to link heterogeneous systems.

Evidence of this different philosophy is IBM's move from Systems Network Architecture (SNA) to Systems Application Architecture (SAA). SNA was focused on linking single product lines, while SAA provides common user access across different product lines.

Events leading to IBM's current telecommunications strategy are part of a painful learning process.

Many of the lessons were learned after IBM acquired Rolm, capturing a large base of users and excellent distribution channels as well as a digital switch product in the process.

But if there was ever a mismatch in corporate cultures, IBM and Rolm was it. Rather than giving Rolm its own identity, IBM tried to control it. IBM shifted emphasis from Rolm's successful CBX to the 9750 system, which more closely resembled IBM's other products. IBM's biggest mistake with Rolm was to attempt to make sales by making an end run around the telecommunications director to appeal to other executives in the company who were more familiar with IBM. This tactic resulted in many salesman being shown the door.

The Rolm experience taught the company the value of joining with a partner that knows the market and possesses substantial resources of its own. This realization led to the sale of Rolm's manufacturing and development segments to Siemens and the joint marketing of Rolm products.

Rather than a sign of another failed effort, IBM's partnership with Siemens is a healthy indicator that the company has learned the lessons of its past failures in telecommunications.

IBM's interest in Integrated Services Digital Network (ISDN) also reflects the new understanding. The organization has reportedly been conducting internal ISDN trials for some time. Its ISDN strategy is to develop products while supporting standards as closely as possible and listening for signs of interest from customers.

In the meantime, IBM and Siemens must move quickly to resolve the issue of supporting Rolm users. IBM is also quietly turning much of its private branch exchange (PBX) activities over to Siemens and the newly formed offspring, Rolm Co. and Rolm Systems, Inc.

Real-world experience

Siemens also brings real-world ISDN experience, central office technology, transmission system expertise and a world-class high-end PBX system, called Hicom, to the table. The next order of business is to consolidate product development, service and technical support to present a unified image to users.

In other important areas, IBM's moves in communications are more solidly defined. Its relationship with Network Equipment Technologies, which manufactures the Integrated Digital Network Exchange switch, was perceived as an excellent move on IBM's part.

Other successes include the IBM Information Network, which links IBM divisions worldwide, and Netview. The company sells time on the network to other companies. Netview is probably one of IBM's most successful products to date, despite new competition from AT&T, which recently announced a similar product called Integrator.

But software is where IBM seems to be placing its greatest emphasis. Of particular significance is IBM's direction toward the established Transmission Control Protocol/Internet Protocol and Open Systems Interconnect reference models.

Most importantly, IBM is reaching out, however cautiously, to the rest of the telecommunications world. In spite of its vast product line, the company has acknowledged a fundamental reality: Users want horizontally and vertically oriented information systems.

Kirvan is head of Paul Kirvan & Associates, a Turnersville, N.J.-based consulting and technical services firm specializing in voice and data communications.

EDITORIAL

Whoops

IN THE MIDST of New England's snowless winter one recent day came the weathermen's cocksure prediction of a major blizzard. People prepped by dusting off the shovels, hunkering down at home, staying away from restaurants and movies. . .

Only the storm never came, as has been the case all winter, and restaurateurs and other businessmen whose livelihoods depend on people leaving their homes were furious.

Last week a storm that wasn't predicted hit the personal computer software business when industry stalwart Microsoft said its profits would nose-dive this quarter, largely because the company will be late in shipping a pair of word processing packages (see story page 6). As a result, company founder Bill Gates lost a king's ransom on paper, PC technology stocks across the board were plundered and, without a doubt, customers across the country are scratching their heads and wondering just whom you can trust these days.

Many leading experts were surprised that Microsoft would miss a deadline, as the company had a reputation of doing what it said it would do. But that is a reputation earned only in recent years. You may remember that the vaunted Windows package was a good 18 months late.

So now Microsoft joins the ranks of Lotus (a year late with the hotly anticipated 3.0 version of 1-2-3), Ashton-Tate (late on its promised ship date of Dbase IV) and a host of other PC software companies stepping up to the podium to accept this month's "Waiting for Godot" award.

For those corporate customers that have laid plans in concrete based on the timely release of bug-free products, these foul predictions could spell trouble. Fortunately, you have to believe that no one really takes these companies seriously anymore — not when it comes to delivering the goods on time.

It is safe to assume that these companies are not intentionally misleading their customers on ship dates to, perhaps, freeze purchases of competing products already on dealers' shelves. One look at the steep costs of tardiness to Microsoft, Lotus and others will assure you of that.

The problem will be with the industry for some time because of the widening gap between the extraordinary developments in microprocessor technology and developments in software technology that the hardware supports. Consider that Intel is in the advanced stages of work on a million-circuit processor chip, yet we don't even have commercially viable applications to run on the previous generation of 80386 processors, unveiled more than three years ago. In fact, we haven't even seen software that fully exploits the 6-year-old 80286 chip generation.

The complexity of PC software development for today's chip platforms is mind-boggling. It is also prohibitive in terms of providing some of the desktop-based solutions so many experts crow about, at least in the near term. This is bad news for the software developers — and important news for customers.

LETTERS TO THE EDITOR

Compaq-ibility

Regarding Compaq compatibility: We wanted 286 board compatibility, 386 software compatibility and a taste of 386 power. A discount price, impressive graphics and the Compaq Computer Corp. name were too much to resist, so we purchased a Compaq 386S.

Our old (before 16-bit slot compatibility) Plus Hardcard is not usable (no upgrade available at any price); there goes the cheap add-on disk. The drive mounting rails are unlike anything we have seen in any other computer — so much for the value of any 5¼- or 3½-in. drives.

We scoured our parts distributors, service depots and Compaq retail outlets. We called Compaq and two independent drive makers that provide drives for the 386S. The result — no rails without a drive, and no hints as to where we could possibly find them.

So much for the "protection of our investment" in disk units. So much, also, for affordable new upgrades this side of those carrying that "discount" Compaq parts label. Will we really be better off if Compaq (instead of IBM) becomes the leading player to call the shots that mold the computer bus architectures of the future?

William H. Kreider
Chairman
Systems and Software Services Ltd.
Media, Pa.

Librarians

Regarding "Snoopers see MIS as Dr. No" [CW, Feb. 20], readers should know that there is an alternative to MIS for competitive intelligence applications — the corporate library or information research center. Many librarians have developed sophisticated computer skills as a direct consequence of MIS hesitation to support library applications.

Because these library applications require text management expertise, librarians are the ideal partners to work with competitive intelligence departments to design and develop competitive information systems. They also know how to track down and collect information for competitive intelligence use through on-line services, press clippings, trade journals, competitor ads, government agencies and industry experts.

Many corporate libraries already have a private database application that, if it does not already include the skeleton of a competitive information tracking system, can be easily expanded to contain this information. Even though the competitive intelligence department is at the bottom of the MIS department's list, they can find expert support for their database application right in their library.

Pamela N. Danziger
Director
Information Research Services
Franklin Mint
Franklin Center, Pa.

SQL performance

In "Getting the most out of SQL" [CW, Feb. 13], William Inmon focuses solely on one aspect of database use — transaction speed. In fact, he is urging us not to take advantage of some of the most useful and important features of relational databases such as set processing, joins and referential integrity.

The tone of Inmon's article is that raw performance is the sole criterion for judging the worth of a system. Making database structures and processing rules more complex increases the development effort and the risk of error; development time and bad data are expensive. Lack of easy access to information also costs an organization money. Some of the measures Inmon advocates, particularly denormalization, are costly in both these ways.

Our organization decided to use a relational database because of its ad hoc query facility and its flexibility for developers, among other things. We have been running a mix of transaction programs, inquiry programs, end-user queries and carefully chosen data definition work in the daytime for over four years.

From time to time, we encounter periods of poor performance. The solution may be tuning the system, fixing an application program, user education or more powerful hardware, but in any case, we see the problem as a symptom of our success, not of failure. We feel that the reduction of this kind of response time from years to minutes is well worth the occasional headache of balancing performance factors.

James D. Gawn
Application Development Manager
Millersville University
Millersville, Pa.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

The 'musts' and 'must nots' of PS/2-OS/2

AMY D. WOHL

Commenting on a vendor creates a kind of love/hate relationship: When the vendor does well, they love our noticing; they hate it when we report that things are going less than well.

Analysts in general have been down on IBM's Personal Computer strategy for quite some time now.

Market research indicates that corporate accounts are buying into the Personal System/2 and OS/2 strategy more slowly than IBM had hoped. PS/2 sales have fared well, but a substantial percentage of these systems cannot run OS/2 at all (Models 25 and 30). There are also many OS/2-capable models (the 30-286, 50, 50Z, 60, 70 and 80) that are purchased with too little memory to load and run OS/2 without expensive upgrades.

Many corporate buyers say they will not even consider a move to OS/2 until substantial applications software arrives — an event industry commentators expect not to happen in volume this year.

MCA befuddlement

IBM customers — and everyone else — are confused as to what Micro Channel Architecture (MCA) is supposed to be about. Is it just about potential advantages in performance? Or will IBM develop software that requires MCA as an enabling platform? Are Compaq and its Gang of Nine correct when they claim the Extended Industry Standard Architecture (EISA) will be MCA-equivalent? For that matter, will EISA ever materialize? Suspicions and rumors abound, but fact has been hard to come by.

In the best presentation of a recent IBM briefing, Dr. Robert Carberry, a senior IBM scientist, knowledgeably and candidly commented on the theory and status of MCA. Ask IBM

Continued on page 25

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

Beatles protest Sgt. Sculley's Lonely Hearts Club Band

GLENN RIFKIN

News item: The Beatles, whose record company was called Apple, are suing Apple Computer, Inc. for violating a trademark agreement that barred the U.S company from putting the Apple name on various musical products.

The Beatles, who really don't exist anymore, are suing those sneaky Cupertino Cuties for leaping into the music business. This is serious. Everyone knows the Beatles (who don't really exist anymore) need more money.

Rumor has it that John Lennon's working on a new album — the 14th release since his death — and everyone knows how pricey studio time in New York can be.

Paul McCartney could use the dough. He reportedly wants to buy the copyrights to the entire works of Beethoven, Mozart, Mitch Miller and Spike Jones.

And, of course, poor George Harrison and Ringo Starr are down to their last $30 million or $40 million.

But this suit is about more than cash. The Beatles (who still don't exist anymore) are worried about rumors circulating through Silicon Valley that John Sculley is about to release his first album.

That's right. The wiley and multitalented CEO is said to have formed a heavy metal group called Johnny and the DeeRams. Sources close to Apple (the Mac makers, not the music makers) claim that the band does some very passable renditions of old Beatles' tunes.

Among the cuts: "I Wanna Hold Your Lan," "All We Are Saying, Is Give Mac a Chance," "The Yellow Subroutine" and "The Long and Winding Node." Sculley reportedly sings lead and handles the keyboard.

The Beatles, who are rumored to be planning a reunion concert to raise funds for the upcoming legal battle, object to Apple Computer's unabashed move into the music business.

Sculley, in a prepared comment, said, "I can understand why the boys might be upset. But we've got to raise some money to offset the cost of all those ridiculous chips I bought last year."

Rifkin is a *Computerworld* senior editor.

Digesting nouveau programming

Old-time software developer must cultivate a taste for new methodology

MICHAEL B. COHN

I didn't take the possibility of a move seriously until they interviewed her a third time. It seemed *too* good — tremendous opportunity, much more responsibility, almost twice the pay.

But when I picked my wife up at the airport, she was beaming. "I got it," she said. "They want me. They want me to move there in six weeks."

Of course I was pleased for her. But moving was another story. I had just landed two more sales accounts, and one of them was talking about purchasing a general ledger system.

When I ran the situation by my sales manager, he assured me that a transfer was possible. "We have a lot going on in that city," he said. "Let me see what I can do."

The good and the bad

True to his word, a week later, the boss called me into his office. "I've got good news and bad news," he said. I prepared for the worst. "The good news is I can get you that transfer. Same salary, same seniority, same everything."

I gulped hard. Looked like I didn't have an excuse for not wanting to move.

"The bad news," he said, "is that the only positions down there are in programming. But you used to be in software development, and it's like riding a bicycle. You'll pick it up again."

Programming? I hadn't programmed in 10 years. I liked selling software. I didn't like making it.

But when I contacted my potential new manager, he assured me I would fit right in on his software development team. An exciting new project was starting up, and it would take only 10 months. He even promised me an extra-large cubicle.

Four Mondays later, at 8 a.m., I was a programmer again.

My new manager directed me to an extra-large cubicle, but regrettably, the whole development team was in it. No one looked a day over 25. Everyone wore wire-rimmed eyeglasses. They all went out for salad at lunch. There were no brown bags. No butt-filled ashtrays. No 12-year-old ties. This wasn't how I remembered data processing.

That afternoon, Barry, the "Lead Programmer," called me into his office. Pictures of expensive German cars lined his credenza.

DEBORAH WHITNEY

"I've heard a lot about you," he said, running his thumbs underneath his suspenders. "What kind of technical background do you have?"

"Well, when I started, there were only about 10 of us in software development," I responded, thinking that this guy was probably still in junior high at the time. "We did a lot of assembler and Cobol, and I was pretty handy with Basic."

"Oh no, Basic's so old-fashioned. We all use Basique now; it's much more contemporary." Barry cleaned his glasses with his silk tie. "I advocate Cobol Light, myself — one-third less coding than regular language. But tell me, what kind of stuff would you like to do for me?"

I was starting to get a very bad feeling about this situation. But it was temporary, I kept telling myself, until I could find something else. I decided to play along.

"Well, Barry, I'd better start by reading over the functional specifications for your new system. If you'd like, I could probably start grinding out some programming-level specs or finalize some report layouts. Or, if Cobol Light is not too difficult, I could start writing a program or two. Do you have any coding pads?"

Barry leaned back in his leather chair and laughed. "Hold on, General. This isn't the old days, when you went blindly charging into battle." He pulled out a glossy burgundy notebook. "We like to work efficiently now . . . use quality time and quality methods. We have productivity grids. Error-prediction models. Tiered-test scenarios. Resource curves."

Barry flipped through the four-color graphs and pie charts in his three-ring notebook. None of the pages looked like Cobol Light to me.

Planned programhood

"So first, we have to have a comprehensive strategy," Barry continued. "We'll start with a development plan. And of course, we'll need a few weeks to evalute and select a project management software package. Then we'll work on the expected-error matrix. And we'll still need a Human Factors and Usability Plan, a Code Inspection Plan, a Productivity Measurement Plan and a plan for Plan Tracking."

I hadn't planned for any of this. "Barry," I said, "I can appreciate the importance of all this front-end work. You can't write a system without a schedule. You can't write a system without a design. But I was told that this was just a 10-month project. When will we actually write the system?"

"I'm not sure I follow you," Barry responded, as he laid out a professionally printed chart of colored boxes and lines. "I've got over 30 man-months of writing to do just in Phase 1. Look at all

Continued on page 25

Cohn is a quality assurance representative based in Atlanta.

These men started a revolution on campus.

Recently, an information management revolution occurred at the University of Wisconsin–Stevens Point. Dan Goulet from the University and Jim Leonhart of AT&T—campus radicals of a different kind—explain how they were able to realize a bold and complex vision.

FEBRUARY 22, 1989

Jim: I remember the first day we met. You had been around the block a few times, but weren't getting the answers you needed.

Dan: We wanted to create a unique education environment: a free-flowing on-line computer campus. We had a vision, and we were looking for someone to help build it.

Jim: A distributed networked computing solution, that's what we'd call it now: a way to process, move and manage information effectively, throughout a widespread organization.

Dan: We talked to many computer vendors before you. We got tired of describing what we needed, so we drew it. That graphic was about 13 feet long.

Jim: More like twenty. The chart showed every information resource on campus linked together, accessible to students, faculty, and administration. It became the wallpaper in my office for fifteen months.

Dan: It was like a blueprint for a data superhighway.

Jim: We put our ISN wide-area network at the center—like an interchange—and built fiber and twisted-pair data lanes to applications running on AT&T 3B2s, DEC, UNISYS and other hosts located in all the departments. We put on- and off-ramps in strategic locations: StarLAN networks that gave access to the highway from workstations.

Dan: We designed everything from the user perspective. The more technically remarkable the system became, the harder we worked to make it approachable.

Jim: Easy for novices, powerful enough for programming students.

Dan: We developed a menu-driven user interface that is consistent and clear. Students and faculty can select applications like checking spelling, transmitting course grades, even browsing through the on-line card catalog of 1.5 million books at the University of Wisconsin–Madison. We wanted desktop power and access, but we wanted to process information where it made the most sense.

Jim: Thinking back, we realized early that the complexity of your vision precluded a single-system focus. You needed open systems.

Dan: You were really the only ones that understood this point. Open systems allow us to use off-the-shelf components; vendors have to bid against each other to get our business. Open systems are the secret.

Jim: It's mind-boggling how much computer power is out there. We wanted to harness it all, yet give a piece to every individual.

Dan: A truly distributed network, one we don't think we'll ever outgrow. We've added 300 WGS workstations in the last five months.

Jim: Dan, where in the world is that wallpaper today?

Dan: We had it bronzed. Today, so many colleges and businesses really need a similar solution. That's probably why we've had so many visits from them lately.

Jim: Little did we know back then, when we first met.

Dan: Oh, something tells me you had a hint.

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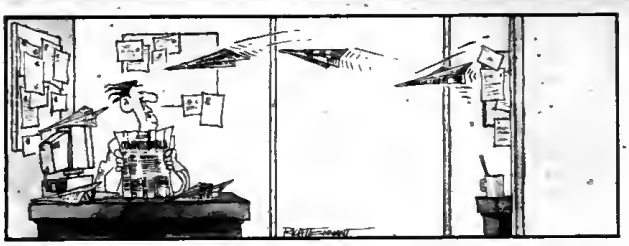

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31 Dir. Mgr. Supvr. of Programming
32 Programmer, Methods Analyst
35 Dir. Mgr. Supvr. OA/WP
38 Data Comm. Network Systems Mgr.

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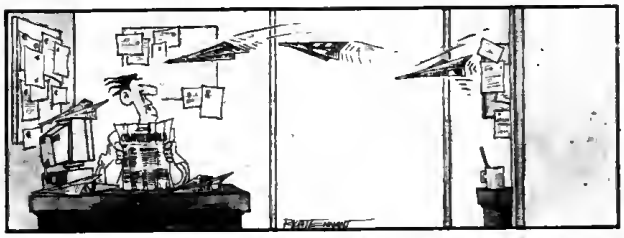

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81 Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
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Wohl

CONTINUED FROM PAGE 21

for a copy of his white paper, "A Design Perspective on IBM's Micro Channel Architecture" (November 1988), if you want to know the whys and wherefores.

As a result of this meeting, I am at least semiconvinced. I now believe that if you are buying PCs and need upward compatibility with IBM mainframe and mini environments, you should definitely consider buying only Micro Channel machines.

But I am still unsure as to whether this course is an immediate imperative if your PCs are mainly deployed in other environments, such as stand-alone devices, systems attached only or mainly to local-area networks and PCs that serve as front ends to other vendors' systems.

Confusion reigns

Users are confused as to the status of the elusive OS/2 applications software. Even big, sophisticated buyers are not sure what to plan for and when it will come.

Contributing to this confusion is the fluid status of other, competing environments. Is DOS going to be very durable? some ask. What about Windows? And why do I keep hearing more and more about Unix? IBM cannot wave its magic wand and clear up all this confusion, but it can and did comment candidly on its own plans and on what its customers demand.

IBM seems to see the personal computer marketplace splitting into two parts: a low-cost home/school/small office PC-as-smart-terminal market that it wants to participate in but cannot and does not control, and a high-capability and higher priced corporate workstation market that it wants a much bigger percentage of. IBM's current product strategies seem sharply pointed at exactly that end.

Of course, as always, Monday morning quarterbacks can point out some needed refinements: Prices, especially at the low end, need to be more competitive; customers need more choices such as smaller drives for the 70 to create a lower-cost Intel 80386-based machine; and IBM has got to put out much more frequent, updated information about the status of MCA-enabled applications and OS/2 (especially OS/2-PM) software.

Put off till tomorrow

Perplexed by IBM's aggressive marketing of PS/2s, MCA and OS/2 and counter moves by competitors, customers have been inclined to put this decision on the back burner. The announcement of the PS/2 Model 30-286 in September 1988, for example, allowed IBM competitors to laugh in glee and mistakenly call it the reintroduction of the PC AT.

Let's wait, customers say. If everything is this confused, we must have lots of time.

But waiting to consider strategies, schedules and migration paths is exactly what customers cannot afford to do. Buying older PC technology when you will need to move to newer technology soon may mean writing off partially used investments — and your corporate accountants may not like that very much. In fact, they may require you to use the old stuff up, which could delay your ability to take advantage of new software as it becomes available.

The machine of choice now is clearly a PS/2 Model 70 or equivalent. It opens every future door while continuing to permit the use of your existing software investment. But just as clearly, not many will choose to make this move quickly. The price is still too high, and many people simply do not need that much power yet.

Path of least resistance

The minimum move is much more simple: Do not buy any more desktops that cannot load OS/2. Even if you are not investing in all that memory now, make sure the machines can be upgraded later. And consider moving your servers to OS/2 soon. IBM and its colleagues will fully support mixtures of DOS and OS/2 machines in OS/2 LAN and server environments. This setup gives you a window into the future while permitting an easier migration path from past investments.

But everything hinges, of course, on the software. Rest assured, the software is coming — OS/2-PM versions of old friends and entirely new packages, some from entirely new companies.

When the compelling application comes, I think we will know it. But do not expect it to be a spreadsheet or a word processor. The next round will belong to using the workstation on your desktop as an access to all the information you need and to letting you have that access on your own terms.

The software developer who supplies that prize will not only have our thanks but rounds of applause from every hardware vendor in the industry. Expect IBM — and the analysts who comment on it — to happily lead that parade.

Cohn

CONTINUED FROM PAGE 21

these deliverables . . ."

"Yes, but when do we write the code?

"Code?" Barry winced. "My people don't code. That's what we hire contractors for." He told me we'd discuss this matter later. He seemed a little upset.

I headed back to the cubicle, a bit perplexed. Maybe things had changed since the old days. Maybe coding pads were passe. Maybe there were code generators and fourth-generation languages that churned all the source. Maybe my new teammates could explain all this to me.

But it was 4:30 sharp, and everybody had gone home.

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—Software Magazine 1988 Software Market Survey

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HARD TALK

J. A. Savage

NAS meets its prince

Speculation about the future of National Advanced Systems is over, at least for the short term.

Hitachi and Electronic Data Systems found the glass slipper dropped by Memorex Telex. It's the second or third time the shoe has been dropped, depending on how you count. The deal should be consummated.

Unloading NAS hasn't been easy for National Semiconductor. After NAS had been on the block for months, the first and most logical buyer, Hitachi, didn't come up with enough money. The second deal, in which National Semi would co-own NAS with Memorex, was a stretch of the imagination. Those two companies would have had little in common in the major product — mainframes — but would share knowledge of storage devices. Just the same, any company willing to take on NAS at the time would have looked good.

Memorex couldn't raise the cash for its part of the deal. One analyst said it was because one big-time investor dropped out. While Memorex scrambled for the funds, it missed two dead-

Continued on page 32

Mini vendors adapt in order to survive

ANALYSIS

BY JAMES DALY
CW STAFF

One of the oldest laws of the jungle warns that if you can't beat 'em, join 'em.

The recent introduction of powerful and inexpensive Unix-based workstations and servers by minicomputer makers Digital Equipment Corp. and Data General Corp. are the latest walking, talking examples of that creed.

The truth is, DEC and DG had few options in their decision to play hardball with workstation makers such as Sun Microsystems, Inc. and Apollo Computer, Inc. In the past few years, both companies have received a painful price/performance black eye from Sun's highly regarded Sun-3 and the ramping up of the Sun-4 reduced instruction set computing (RISC) line.

The result is that minicomputer vendors have been forced to do some rapid paddling to keep their heads above water. In the case of DEC and DG, the arithmetic for solving their problem was simple: cannibalize their own products or sit idly by while others did.

"If we didn't introduce [the workstations], somebody else would," confessed Herb Osher, division director of product marketing at Westboro, Mass.-based DG.

Assault on minicomputers

Price/performance threats from Sun and Apollo dragged minicomputer makers into the workstation battle

	MIPS	Base price
Data General's Aviion	17	$7,450
DEC's Decstation 3100	14	$11,900
DEC's Decsystem 3100 (eight-user system)	14	$22,000
Sun-4/110	7	$18,900
Apollo 4500	7	$18,990
HP 9000 Model 360 SRX	4.5	$14,400
IBM RT 6151-115	4.5	$10,000

SOURCE: CW CHART: FRANK C. O'CONNELL

Both companies came out swinging. DG's Aviion series offers processing speeds of 17 million instruction per second (MIPS) for a cut-rate $7,450, while DEC followed close behind with the Decstation 3100, which boasts 14 MIPS for less than $12,000.

Continued on page 33

Unix, Pick shake hands

BY MITCH BETTS
CW STAFF

After a three-year battle to capture the multiuser systems market, the Pick and Unix operating systems are headed for an era of peaceful coexistence on the same computers.

A tour of the International Spectrum '89 show in Washington, D.C., last month made it clear that Pick-oriented vendors — recognizing that AT&T's Unix is winning the battle — have decided that the best strategy for growth is to latch on to the Unix bandwagon.

For users, the emergence of Unix/Pick combination products is an opportunity to combine the best of both operating systems — Pick's bounty of business database applications and Unix's communications features.

Furthermore, because of the rigid standardization of the Pick operating system, Pick-based applications are more portable than Unix applications, said Wayne W. Wahlenmeier, vice-president of Fujitsu Microsystems of America, Inc., based in San Jose, Calif.

Wahlenmeier recently pre-

Continued on page 33

Still reason to believe in System/36

BY STANLEY GIBSON
CW STAFF

ATLANTA — While the computing community is wowed by early sales figures for IBM's Application System/400, some users who are sticking with the System/36 are finding the pickings have never been better.

Realtec, Inc., a developer of retirement communities based here, said it is happy with the System/36 and has not yet been swayed toward the AS/400. The firm uses a System/36 Model 5360 to run its affairs at its headquarters in the Buckhead section of Atlanta. In addition, it uses a 5362 to run a sales office in nearby Norcross. When the firm completes a retirement community, it administers the development with a System/36.

Ernesto Espinel, information systems director at Realtec, said there are three main reasons for continuing with the System/36: Capacity requirements are currently being met; Realtec does not want to convert its software; and prices on used System/36s have never been better.

"You can't beat that price," Espinel said, referring to mod-

Continued on page 32

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SOFT TALK

Michael Molyn

The quest for distribution

The corporate application of the future will likely access data that is stored neither centrally nor locally. Instead, the data will reside in a network-aware, dictionary-intelligent, heterogeneous processor environment referred to as "truly distributed."

I have been exploring distributed database issues for more than eight years; the industry is just beginning to see products that are minimally useful. However, I have yet to see a product that will provide true "transparent" access across multiple platforms — workstation-to-host, host-to-local-area network, workstation-to-workstation — in a realistic corporate setting.

If you have ever been responsible for testing and recommending database products for a large service-oriented organization, you know that the phrase "the vendor promised," is not likely to elicit a positive response from your customer. To avoid waiting on the promises of a single vendor, you may have to recommend products that are available now, although they are incomplete and will have to be set aside when a better offering is available.

The concept of "distributed" data came into being as a result of customers' need to localize information processing both

Continued on page 31

Color codes tame unruly tapes

Arco's drive for efficient tape management yields commonsense solution

ON SITE

BY ROSEMARY HAMILTON
CW STAFF

HOUSTON — A year ago, it took the computer operations department of Arco Oil and Gas Co. 10 minutes to mount three reel-to-reel tapes. These days, the same job takes three minutes, according to Don Wells, computer operations manager.

And all it took was some common sense, Wells said.

Wells' staff recently completed a project that changed the way it managed tape operations. That project coincided with a conversion effort from Storage Technology Corp. 4670 reel-to-reel tapes to IBM 3480 tape cartridges. But the new tape management procedure was not set up to suit the new tapes. The goal of efficient tape management was really a no-choice situation, Wells said.

In the previous year, his department was cut from 30 staff members to 10 as part of an overall reorganization at Arco. The cutback left Wells with three tape librarians instead of his former staff of six.

"We had to get lean and mean and learn another way to do this," Wells said of the tape operations.

Instead of figuring out how fewer people could do the same job that six librarians once did, Wells decided to find a better way to do the job.

First, he studied the old procedure. Tape librarians would pull tapes from racks when the computer alerted them as to which tapes were needed for the next job. A staging process would take place, with tapes being pulled from their storage racks and stacked near the drive area.

This staging would often cause jobs to be put on hold while librarians hunted down the needed tapes. Delays were typical because jobs often required several different tapes that were located in different racks throughout the storage area, Wells said. It was not uncommon to be delayed further because tapes had been returned to the wrong racks, he added.

Wells discovered that tape searches and staging were unnecessarily time-consuming. By changing these procedures, the tape-mounting process could be shortened by several minutes, Wells said.

The tape drives had been located in one section of the operations room and the racks of tapes were located in another. So Wells' staff pulled the racks from one storage section and rearranged them in a horseshoe pattern. The staff then moved the tape drives to the center of the horseshoe.

The horseshoe was divided into three areas, each with a designated color. Each had 12 tape drives to which the tapes in that area were assigned.

The only departures from this pattern were the remaining reel-to-reel tapes and the tape drives for a Cray Research, Inc. XMP. The Cray operations are separate from the IBM 3090 operations. The remaining reel-to-reel tapes contain data sent to Arco from outside sources.

This horseshoe pattern with tapes corresponding to nearby drives eliminated the need to search for a tape. When a job came up and called for tapes to be loaded in, say, a yellow drive, the corresponding yellow tapes were no more than 15 feet away, Wells said.

This setup was achieved with the help of a software program called the Shared Tape Allocation Manager from Duquesne Systems, Inc. The software, which runs under the IBM MVS operating system, made the assignments of tapes to drives and keeps track of a drive's activity.

By so doing, the software is also able to establish a backup system for tape loading. If all the drives in the first tape area are busy, the software program can assign tapes to the next available and closest drive, Wells said.

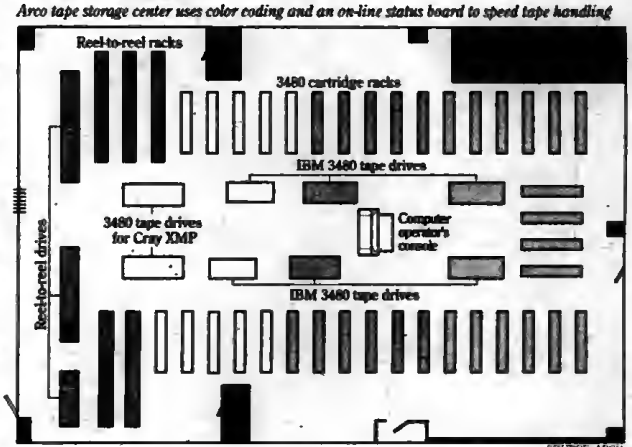
With this setup, Wells was able to reduce his library staff further. There are now only two librarians, one of whom serves as a backup to the lead librarian. The librarian has a tape administrative role now.

The computer operators have taken on the other librarian's responsibilities, including pulling and mounting the tapes, because these procedures require so little time now, Wells said.

"I definitely think it's a more efficient," said Jim McCullor, manager of processing support and Wells' supervisor. "The end users don't see their jobs going into hold now while tape librarians go get the tapes."

Color coordinated

Arco tape storage center uses color coding and an on-line status board to speed tape handling



SOURCE: ARCO
CW CHART: FRANK C. O'CONNELL

Users converge on Uniforum 1989

BY JEAN BOZMAN
and PATRICK WAURZYNIAK
CW STAFF

SAN FRANCISCO — It was all in a day's shopping. Users came from Canada, the East Coast, the Midwest and even from Europe to see what new Unix wares were being shown at Uniforum 1989, the International Conference of Unix Users held here at the end of last month.

One woman from eastern Canada, seen lugging her tote bags through the 110,000 square-foot exhibit in the Moscone Convention Center, evaluated whether the long trip was worthwhile. "It's a great convenience when you can see everything in the Unix market under one roof," she said. "It looks like we'll be back next year."

Shopping for technology along with her were many of the user group's 5,000 members. Their ranks have swelled since 1982, when Uniforum began with 1,000 attendees in San Diego. In all, Uniforum's organizers estimated that 25,000 people attended the show.

Among the hottest news items scattered along Uniforum's runways were these:

- Sony Microsystems Co. in Palo Alto, Calif., said it had reached an agreement with Mips Computer Systems, Inc. in Sunnyvale, Calif., to use the MIPS R3000 reduced instruction set computing (RISC) chip when it becomes available later this year. The R3000 will power Sony Microsystems' News workstations, which are now based on the Motorola, Inc. 68030 chip. Japanese sales will start in 1989, followed by U.S. sales in 1990. Sony also announced that it planned to support both the Open Software Foundation and the Unix International, Inc. standards.
- Intergraph Corp. in Huntsville, Ala., announced the Interserve 3505, which is based on Intergraph's proprietary C300 Plus RISC chip. Intergraph said the server would be the first in a series of RISC-based machines designed for the high-performance Unix market. The company claimed performance of up to 20 million instructions per second (MIPS) for the server and bus speeds of up to 200M byte/sec. The Interserve 3505, scheduled for shipment in the third quarter, is priced at $76,000.
- Motorola announced a line of systems based on its RISC chip, the 88000. The Delta Series 8000 also includes two models based on Motorola's 20-MHz processor. The Model 8864, said to run at 17 to 60 MIPS, has 16M to 64M bytes of main memory and 20 expansion slots. Prices range from $52,940 for a single-processor system to $80,190 for a four-processor unit. An entry-level unit, the Model 8608, has 8M to 32M bytes of main memory and 12 expansion slots. Also rated at 17 MIPS, it is priced at $27,835.
- Tandy Corp. in Fort Worth, Texas, said it would be the first to license and offer the Open Desktop interface. Tandy plans to ship Open Desktop in the third quarter. It will come in single-user, multiuser and developer configurations, and prices will start at $995. Tandy has licensed the software from The Santa Cruz Operation (SCO) for its 80386-based Tandy 4000 and 5000MC series of personal computers. Open Desktop will be licensed to other vendors and will also be available from SCO.
- Interactive Systems Corp. in Santa Monica, Calif., said it has been licensed by Sun Microsystems, Inc. in Mountain View, Calif., to distribute and sublicense SunOS for the Scalable Processor Architecture RISC-based architecture. Under the agreement, Interactive will incorporate its own extensions into SunOS.
- Informix Software, Inc. in Menlo Park, Calif., announced support of Open Desktop with its Wingz graphics spreadsheet and its line of fourth-generation language application development tools. Informix also said that its database management system software has been selected as the core database for the new AT&T Accumaster Integrator.

Molyn

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for quick development and fast access. Now, microcomputer database management system manufacturers are rushing to provide products compatible with mainframe databases, which still are the major data resource facilities in most large firms. Also, most distributed DBMS vendors have been marketing their products by promising transparent distributed data access to the user across multiple hardware platforms.

These trends are a big step toward converting products that were merely microcomputer file managers to fully functional DBMS packages with the same features and functionality as products running in the mainframe environment.

But what are the best distributed products still lacking?

Among other things, I have not seen a product yet that contains a realistic data-naming scheme with a corresponding dictionary subsystem. Additionally, I have not seen a product that attempts to provide for referential integrity or dynamic update for replicated or fragmented files.

In the coming year, data will be further distributed on network file servers, the host and individual workstations. Many applications projects are proceeding under the assumption that a distributed DBMS suitable to their task will be available and supported by the time their project is delivered. Currently, though, much of the data distribution taking place is through replication or partitioning.

While vendors continue to hype the "advantages" of their latest distributed offerings, it might be useful here to address what it is that corporate data administrators are not looking for:

- A decrease in processing efficiency. The fact remains that most distributed implementations thus far have tended to be both CPU and network hogs. It is thought that this condition will improve substantially with the new breed of distributed DBMS but, as yet, we only have promises.
- Increased responsibility for data integrity and security. As more corporate data is stored locally on file servers and tape backup units, we in data administration need products that allow us to provide reliable, recoverable databases without having to depend on customized applications run independently by local users.

Any areas planning distributed applications would do well to begin by examining the following recommendations:

- Identify a distributed strategy that makes sense for your corporation, taking into account your corporate mission and anticipated long-term operating environment and vendor commitments.
- Create and maintain corporate standards for data storage on intermediary devices. See to it that these standards are published and followed in the projects that are being planned now.
- Assemble a group of experts from the appropriate disciplines to make decisions about how the distributed climate will be supported once production applications are under way.
- Experiment with various product offerings from different vendors to become familiar with the operating constraints of different products. This approach has the added advantage of ensuring that your preferred vendor will be forthcoming with a product that meets your needs and your environment.

IDENTIFY a distributed strategy that makes sense for your corporation, taking into account your corporate mission.

Molyn is an industry expert on distributed database currently working in Hartford, Conn., at Travelers Insurance Co.

SOFT NOTES

IBM, Polygen in development pact

IBM and **Polygen Corp.** in Waltham, Mass., signed an agreement under which Polygen will develop enhancements to its application software for the chemical and pharmaceutical industries for use on IBM mainframes and workstations. IBM also said it will assume a minority equity interest in Polygen.

Among the products to be enhanced are Charmm and X-Plor software for computational chemistry; Quanta advanced three-dimensional visualization software for computer-aided design of molecular structures; and Centrum research automation software that allows text and pictures to be combined into compound documents.

The software will be made to work together using the IBM 5080, IBM's RT running AIX, the Personal System/2 running AIX, the IBM 3090 with Vector Facility as well as the 9370.

NCR Corp. said it signed a cooperative marketing agreement with **Oriole Systems, Inc.** in Towson, Md., to market Respond, a manufacturing and business management system application for NCR systems. Respond has been designed to meet U.S. Department of Defense requirements for materials handling and inventory control, according to Oriole.

Relational Technology, Inc. said it joined the 88Open Consortium Ltd. software initiative program. The software initiative was formed in 1988 to promote the development of software for the Motorola, Inc. 88000 reduced instruction set computing architecture.

Relational previously said that its Ingres relational database management system will support the 88000 microprocessor family.

Sun Microsystems, Inc. and **Fuji Xerox Co.** launched a joint venture named **Unisol Corp.**, based in Tokyo. Sun and Fuji Xerox, a Japanese affiliate of Xerox Corp., contributed a total of $4 million to found the firm, which will develop and sell software based on AT&T's Unix and the Open Software Foundation's Open Look for Japan's workstation market.

Digital Equipment Corp. announced recently that **The Santa Cruz Operation** (SCO) selected DEC's X/User Interface technology for its Open Desktop operating environment. SCO sells software based on AT&T's Unix for personal computers using the Intel Corp. 80386 microprocessor.

VI Systems, Inc. in Dallas said it joined the Associate Program of Sequent Computer Systems, Inc., through which the two firms will market VIS/TPS, VI Systems' transaction processing package. The software will be sold for use on Sequent's Symmetry systems.

System/36

CONTINUED FROM PAGE 27

estly configured used 5362s, which are currently on the market for $5,000.

Realtec is now completing an average of one major project per year. If that schedule were increased to three or four, Espinel said more capacity would be required, and a move to an AS/400 might seem reasonable.

Realtec moved to the System/36 from the System/34 three years ago. Espinel said the conversion was relatively simple and was accomplished over a weekend.

But, he said, "the AS/400 is a completely different animal. The investment will not only be in hardware but in software. You will be sitting there with a lot of capabilities that will go to waste without a lot of work."

When Realtec sets up a community, it copies the software used at a previous development and runs it on a similar System/36 in the new location. Thus, with a low price for the processor and little or no cost for the software beyond the original development expense, Realtec can automate a community for a very modest price.

In South Carolina, a development called Keowee Key is currently using a 5362 with a 120M-byte disk drive and 10 terminals. The software running that development was just moved to Virginia, where one near Williamsburg called Ford's Colony is operated by a 5362 with a 90M-byte disk and three terminals.

Frequently, a development may sell a lot or a house to a customer. In turn, the customer may desire to rent the house and ask the company to serve as a rental agent, keeping track of leases and billings. The software the systems are running is used for reservations, billing and accounts payable.

One drawback of the System/36 that Espinel cited is the PC Support feature. "It works, but not that great. The interface is not that flexible," he said. He added that he originally intended to use the System/36 as a local-area network server but that the lack of function has deterred him. Realtec headquarters runs six PCs that — along with 15 to 18 terminals — are connected to the host.

Savage

CONTINUED FROM PAGE 27

lines for finalizing the offer.

So, with the shoe back on National Semi's foot, it was back to buttering up Hitachi. But since Hitachi was always waiting in the background, appealing to it wasn't all that difficult. Thus, it's likely that the real coup was convincing the straight-laced and extremely American EDS to participate in the deal.

Analysts say that Hitachi, as a Japanese corporation, has been intimidated by the U.S. market and that with 20% of the ownership going to EDS, it gives Hitachi just enough Americanism to be able to compete.

Hitachi immediately began waving the flag — the one with the stars and stripes. The very day the deal was announced, it began an ad campaign shoring up its good corporate-citizen image. In the ads, the company claims it is multinational and has these major buzzwords: "made in the U.S.," "harmony in globalization" and "cultural assimilation."

Hitachi also played up its "Americanization Program" in which it is aiming at "being accepted as a good American corporation," with American manufacturing and management. It recently doubled the size of its Norman, Okla., DASD plant.

Hitachi will undoubtedly try harder, although efforts at U.S. marketing have, so far, met with guffaws from those schooled in the American method of sales.

Receiving little attention from analysts and users is the possibility of expanding U.S. R&D. While Hitachi builds the machines, NAS is the one responsible for IBM compatibility and also for trying to stay one step ahead of IBM in the added features game.

An infusion of support in R&D could put NAS on a more equal footing with Amdahl, which has been announcing IBM-like features in the last year before IBM itself got around to it.

Another important development feature for Hitachi to pick up on is that of fitting a Unix operating system to NAS mainframes. NAS sponsored such an effort up until late last year; it was disbanded when the company went up for sale.

NAS top managers may be able to keep their jobs, but no one is quite sure about it. The company is sending in at least one manager, and EDS is supposedly sending one. But for now, that's just to look over the shoulders of Robert Howells and David Turner — who have been making the big decisions at NAS since last fall.

While all the specifics about management, strategy and support have yet to be worked out, I have yet to hear one report of dissatisfaction among users. Hitachi and EDS are the handsome prince to NAS' Cinderella — they didn't need a big name, and qualifications were not the biggest priority as long as they were rich and handsome and had a reasonable lifespan.

So, what's wrong with this fairy tale? EDS doesn't sound exactly thrilled to be wearing the crown, and if that company backs out before the deal is signed, Hitachi may be stuck on its own, a prospect that apparently Hitachi, the U.S. government and domestic business have a few qualms over.

Savage is a *Computerworld* West Coast correspondent.

Mini vendors

FROM PAGE 27

Both machines are also based on the highly touted RISC concept, which could be the first step in both firms' evolution toward an all-RISC line. DEC discussed two CMOS RISC processors it is working on at the recent International Solid-State Circuits Conference in New York, while DG is "essentially building a company from within" with its new line, according to Judy Hurwitz, an analyst at Patricia Seybold's Office Computing Group in Boston.

While DEC, DG, Sun, Apollo and others slug it out in the mud, users can watch from the sidelines, comfortable in knowing they will be the winners. Whatever happens, the user is bound to throw in with whoever provides the most bang for the buck.

"We'll be getting a lot more power for virtually no price increase," said Al Rocco, a spokesman at Medical Information Technology, a hospital software supplier in Westwood, Mass., where nine DG minis reside. "We're very anxious to get our hands on" the new machines.

> "WE SEE CASE as our Trojan horse for selling the rest of Digital's features."
>
> WILLIAM STEUL
> DEC

Sun and Hewlett-Packard Co. will have plenty of time to play price/performance catch-up, though. The announcements made by DEC and DG will not bear a substantial application base for at least 12 months.

Still, they are important first steps for both firms. Not only does it prevent hemorrhaging, but it also provides a lucrative opportunity. The annual revenue for the worldwide workstation market grew 53% last year to $4.1 billion, according to a report recently issued by market research firm Dataquest, Inc.

The introductions are also a sterling example of how the mid-range vendors must change in order to survive. While the advent of low-cost powerful workstations is not the beginning of the end for the minicomputer market, it is most certainly the end of the beginning. Minicomputer makers have suddenly been forced to do some powerful soul-searching.

Some analysts said they feel these systems are the beginning of "throwaway" workstations. "I think we'll be seeing people use their machines for only a few years," said Peter Kastner, vice-president of Aberdeen Group, a market research firm in Boston. "By then the technology will have leapfrogged anything you have and you'll get another. And the cost will allow that."

Additionally, most minicomputer makers are quickly realizing that they will have to expand their traditional horizons — particularly in the communications area — if they hope to survive. "Instead of being batch-oriented terminal-and-host systems, we'll see minicomputers used as file and data servers," said Vicki Brown, an analyst at International Data Corp. in Framingham, Mass.

Several minicomputer makers have already made moves in that direction. HP expects to ship the first local-area network manager on OS/2 that is scalable to Unix-based systems and has also unveiled a server-oriented alliance with 3Com Corp. [CW, Feb. 27].

Competitors such as DEC and Apollo also recently announced a joint communications development pact aimed at extending Apollo's Network Computing System.

But these are not the only ways the mini makers intend to stay afloat. DEC officials note that they plan to make a thrust into application-specific software, particularly computer-aided software engineering. "We see CASE as our Trojan horse for selling the rest of Digital's features," said William Steul, vice-president of DEC's Corporate Systems Group in Marlboro, Mass.

Unix, Pick

FROM PAGE 27

dicted that "in five years, Unix and Pick will be so intermixed, you won't be able to tell them apart."

In fact, 87% of Pick suppliers said they will be involved in Unix within five years, according to a 1988 survey by the Pick industry's *International Spectrum* magazine.

"Why fight city hall? The big money is being poured into Unix architectures," said Michael J. O'Donnell, chief operating officer at Ultimate Corp., a Pick systems vendor in East Hanover, N.J.

Pick prudence

At the same time, Unix hardware vendors have decided it is prudent to add the Pick operating system to their offerings in order to pick up customers who are devoted to the 3,000 Pick applications on the market but need more horsepower.

In the last three years, hardware vendors such as Pyramid Technology Corp., Sequoia Systems, Inc., Encore Computer Corp. and Stratus Computer, Inc. have announced support for the Pick marketplace.

Vendors said there are two viable ways to operate Unix and Pick together. One is to run them concurrently, an approach taken by vendors such as Fujitsu, Stratus and Sequoia. They claimed this method provides better performance because each operating system is running side-by-side in its native mode.

The second approach is to run Pick's user-applications kernel under Unix, a strategy called Universe that is employed in bridge software. It was developed by Vmark Software, Inc. in Natick, Mass.

In essence, Universe enables users to run Pick-based applications software on Unix-based hardware. It combines the Unix operating system kernel with a Pick-compatible application layer, including Pick's popular database management system, command language and compiler.

Universe has been ported to dozens of hardware systems, such as the Hewlett-Packard Co. HP 9000 and Encore Multimax systems. In addition, Ultimate recently obtained an exclusive license to run Universe on hardware from IBM, Bull H. N. Information Systems, Inc. and Tandem Computers, Inc.

O'Donnell said the Universe architecture combines the strengths of Pick and Unix by putting Pick up front with the user and leaving Unix to control the hardware.

The consensus among users, analysts and vendors is that Pick is strong as a relational database manager and has an easy-to-use query language but offers poor networking capabilities. As for Unix, they said it is strong in communications, graphics and efficiently controlling hardware operations but is difficult for non-technical workers to use.

"Unix is user-hostile, while Pick is so friendly that it's user-obsequious," said Richard Canty, a senior programmer analyst who works with Pick at Cornuts, Inc. in Oakland, Calif.

The most likely targets for the Pick/Unix combination products are Pick users who have expanding needs for hardware power and communications, as well as Unix users who want access to the library of Pick applications. But small businesses, which make up the bulk of Pick's current market, are not clamoring for Unix capabilities.

"Here in the Northwest, most of us have homegrown [Pick] software. It's working well, and we don't see any need to change it," said Ann Huber, data processing manager at Pathology Associates Medical Laboratories in Spokane, Wash.

"You'll find the larger companies, which have a need to do networking, are going to have a higher interest in this," added Bob Friend, treasurer at Peerless Saw Co., a Pick user located in Groveport, Ohio.

The Pick operating system, licensed by Pick Systems in Irvine, Calif., was first released in 1973, and its proponents are now striving for broader acceptance. "1989 is the year that Pick demonstrates its friendliness with the rest of the computer industry," said one show coordinator Gus Giobbi, chairman of IDBMA, Inc. in San Diego.

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Mail to Informix Software, Inc., Dept. DP88, 4100 Bohannon Drive, Menlo Park, CA 94025. Prices in U.S. currency.

*Offer expires February 28, 1989. Ask us about run-time licenses for UNIX, XENIX and networked DOS systems. **Up to 16MB memory supported if available.
***Obviously, moved 4GL 'C' programs or code written to take advantage of specific operating system features may need to be rewritten or recompiled.

NEW PRODUCTS SYSTEMS

Processors

Pyramid Technology Corp. has announced its entry-level database application development system.

The product reportedly combines a single-processor Pyramid Technology Corp. computer with a choice of database management systems and application development tools from Informix Software, Inc., Oracle Corp., Sybase, Inc., Relational Technology, Inc. and Unify Corp. to provide a starter package for application development. The system supports up to 16 users and is priced from $110,000 to $125,000, depending on the database software.

Pyramid Technology
P.O. Box 7295
1295 Charleston Road
Mountain View, Calif.
94039
415-965-7200

Data storage

A write-once read-many optical disk drive series has been announced by Optimem, a subsidiary of Cipher Data Products, Inc.

The 4000 series reportedly provides 3.9G bytes of capacity on a double-sided 12-in. optical disk. According to the vendor, the drives feature a data transfer rate of 723K byte/sec. and are

Optimem's 4000 series

suitable for permanent storage of extremely large amounts of data. The series is scheduled for delivery in the third quarter.

The list price for the 4000 series with small computer systems interface (SCSI) controller is $17,950. Slave units that can be attached to the SCSI bus are priced at $15,800.

Optimem
297 N. Bernardo Ave.
Mountain View, Calif.
94043
415-961-1800

3M Co.'s data products division has expanded its line of ¼-in. data cartridges with the announcement of three enhanced full-size cartridges.

The models reportedly replace 3M's existing DC600 XTD series and consist of the following: the 150M-byte DC6150 for use in the IBM's Application System/400, AT&T's 3B2/600 and Compaq Computer Corp.'s Deskpro 386; the DC6150 zetamat, a preformatted version of the 6150 cartridge; and the DC6037, a limited length cartridge for software distribution applications. The cartridges are priced comparably with the XTD series cartridges they replace.

3M
8200 Highwood Drive
Minneapolis, Minn. 55438
800-888-1889

Hewlett-Packard Co. has introduced two HP-IB disk drives designed to add removable hard disk drive capability to the existing family of HP 796XB disk drives.

The 152M-byte HP 9262B and the 304M-byte HP 9263B are priced at $9,600 and $14,050, respectively. They include a power supply and one 5¼-in. Winchester-based removable-disk mechanism.

HP
3000 Hanover St.
Palo Alto, Calif. 94304
800-752-0900

Cambex Corp. has reduced prices on its Stor/9000 Central Storage and Expanded Storage memories for IBM's Enterprise System/3090 mainframes.

The Stor/9000 Central Storage has been reduced from $210,000 to $190,000 for a 32M-byte increment, the vendor said. The Stor/9000 Expanded Storage has been reduced from $175,000 to $145,000 for a 64M-byte increment. The company also offers a support plan including preinstallation planning, customer support and a multilevel sparing program.

Cambex
360 Second Ave.
Waltham, Mass. 02154
617-890-6000

I/O devices

Printer Systems Corp. has announced a 50% increase in printing speed for its twin-axial cable-compatible Prima TX dot matrix printer. The upgrade brings the rated speed of draft-quality printing to 324 char/sec., the company said.

The Prima TX reportedly emulates the IBM 4214 and IBM 5224 impact printers and can also be attached to IBM remote cluster controllers.

It is priced from $1,495, the vendor said.

Printer Systems
9055 Comprint Court
Gaithersburg, Md. 20877
301-258-5060

Calcomp, Inc. has introduced an E-size version of its Artisan pen plotter.

According to the vendor, the Model 1025 is an 8-pen plotter capable of producing high-resolution drawings on cut-sheet paper or film.

The device accommodates media widths up to 36 inches and works with several different computers. The plotter is priced at $6,395 and includes a 90-day warranty.

Calcomp
P.O. Box 3250
Anaheim, Calif. 92803.
714-821-2000

Power supplies

Sutton Designs, Inc. has expanded its MM-Series of uninterruptible power supply systems.

The MM-Series Plus UPS line consists of five models offering plug-and-play technology, and each is capable of conversing with local-area networks and Unix and Xenix operating systems, according to the vendor. The units are available in 375-VA, 750-VA, 1,211-VA and 1,500-VA versions.

Pricing ranges from $599 to $1,999.

Sutton Designs
300 N. Tioga
Ithaca, N.Y. 14850
607-277-4301

Sutton Designs' ***MM-Series***

An uninterruptible power supply system designed for multiple, on-line microcomputers or a single minicomputer has been announced by Instrumentation and Control Systems, Inc.

The Lifeline II provides battery back-up for 25 minutes in case of a utility failure, the company said. It costs $2,780.

ICS
520 Interstate Road
Addison, Ill. 60101
312-543-6200

A power-line surge suppressor has been introduced by B.H. Power Products.

Called Zero Surge, the product limits the overvoltage let-through to equipment to a maximum of 10% higher than normal, the company said. The unit incorporates six grounded outlets, a 6-ft line cord and s master switch. It costs $119.

B.H. Power Products
2223 Rebecca Drive
Hatfield, Pa. 19440
215-822-2989

NEW PRODUCTS — SOFTWARE

Database management systems

Ask Computer Systems, Inc. has designed an electronic interface designed to link Manman, its management information system for manufacturing companies, with an Intermec shop floor data collection system.

Called Manman/Dataport, the interface is currently available for Digital Equipment Corp. VAX-based Manman users.

The product reportedly accepts data transferred from the shop floor and updates the database accordingly.

It is priced from $5,184 to $50,400, depending on configuration.

Ask Computer
P.O. Box 7640
2440 W. El Camino Real
Mountain View, Calif. 94039
415-969-4442

Recital Corp. has enhanced Recital, its relational database management system and fourth-generation language.

The product is compatible with Ashton-Tate Corp.'s Dbase language and offers Digital Equipment Corp. VAX/VMS users the opportunity to port existing MS-DOS programs to the DEC environment. The software now includes recognition of Fox Software, Inc.'s Foxbase Plus syntax for arrays and user-defined functions, as well as support of the Clipper Select 0 command, the company said. Pricing ranges from $4,500 to $45,000.

Recital
85 Constitution Lane
Danvers, Mass. 01923
508-750-1066

An interactive table editor for IBM's DB2 Version 2.1 is now available from On-Line Software International, Inc.

According to the vendor, Proedit Version 3.2 is used under IBM's ISPF teleprocessing monitor and is downward compatible with all previous releases of DB2. The product reportedly permits application developers to use ISPF commands when creating or editing DB2 or SQL/DS tables, thereby eliminating the need to to code SQL statements.

The program is available for a one-time license fee of $18,500 per CPU.

On-Line Software
Fort Lee Executive Park
Two Executive Drive
Fort Lee, N.J. 07024
201-592-0009

System software

Innovative Computer Technologies has announced Version 1.1 of Diskview, its I/O monitoring software for Digital Equipment Corp. VAX/VMS computers.

The latest release reportedly includes additional qualifiers for flexible report formatting and redesigned displays. Both single-user and site licenses are available, with pricing ranging from $770 to $1,490.

Innovative Computer Technologies
Unit 32
2861 Sherwood Heights Drive
Oakville, Ont. Canada. L6J 7K1
416-829-2020

Applications packages

Intex Solutions, Inc. has announced that Professor Ray Fair's econometric model of the U.S. economy, Fairmodel, will be incorporated into Troll, Intex's forecasting decision-support system for IBM mainframes.

Scheduled to ship this month, the product was designed for use by banks, financial institutions, government agencies and universities to forecast the U.S. economy under various scenarios.

According to the vendor, the software runs under IBM VM/CMS, MVS/TSO or MTS operating systems, with prices ranging from $3,000 to $5,000, depending on configuration. A 60% discount is available for universities.

Intex
161 Highland Ave.
Needham, Mass. 02194
617-449-6222

AOK Software Products, Inc. has announced Release 2.4 of AOK.abc Spreadsheet, s Lotus Development Corp.-compatible spreadsheet designed specifically for Digital Equipment Corp. VAX/VMS users.

The latest release reportedly includes three-dimensional graphics, minimal repainting and on-line tutorial functions. Prices on a Microvax II two-user and five-user license are $1,400 and $2,500, respectively.

AOK Software
Suite 102
1305 Wiley Road
Schaumburg, Ill. 60173
312-884-7123

Utilities

Softscience Corp. has released Convenience Plus Unix Front End: A Graphic Interface to Unix.

The program reportedly performs file management and administrative functions and produces s graphic tree image of file storage that can be accessed using arrow keys or s mouse. The software is said to be compatible with Sun Microsystems, Inc., AT&T and other Unix-based systems and is priced st $399.

Softscience
Box 42905
Tucson, Ariz. 85733
602-326-4679

A graphics package developed for Sun Microsystems, Inc. Sun 3 users has been announced by Qubix Graphics Systems, Inc.

Leonardo provides graphics, drawing, text and forms capabilities and allows the import and export of files from other systems. The product is compatible with Adobe Systems, Inc. Postscript-based printers and is priced at $1,200.

Qubix
1255 Parkmoor Ave.
San Jose, Calif. 95126
408-292-4000

Rem Associates has announced Release 6 of Remdoc, its automated documentation package for the IBM System/36.

Release 6 allows users to create files and produce reports for up to 30 libraries at one time or to select reports individually and create only the files necessary for that report. Remdoc Release 6 is available in English, French, Spanish and German versions and costs $1,250.

REM
Box 527, Village Station
New York, N.Y. 10014
212-243-2416

Goal Systems International, Inc. has announced Version 2.00.03 of Mastercat/VSE, the company's on-line and batch VSAM catalog navigation tool.

According to the vendor, the software now permits on-line editing under IBM CICS of any VSAM cluster. An audit-trail facility is included. Permanent license fees range from $3,750 to $4,000, depending on CPU size.

Goal Systems
7965 N. High St.
Columbus, Ohio 43235
800-848-4640

Computer-aided software engineering

Promod, Inc., s supplier of computer-aided software engineering (CASE) and computer-sided programming tools, has introduced the Promod/2167A option for use with Version 1.7 of the company's CASE family of products.

The vendor said the option automatically prepares U.S. Department of Defense 2176A-compliant reports. Pricing for the 2167A option will vary with the configurations and size of the system.

Promod
23685 Birtcher Drive
Lake Forest, Calif. 92630
714-855-3046

Software Systems Design, Inc. has announced three integrated computer-aided software engineering tools for testing large and medium-scale Ada programs.

Collectively named Testgen, the set consists of the following: a design-review tool that is reportedly capable of identifying all program paths; the test-strategy generator, developed to aid users in evaluating the economies of various test strategy trade-offs; and the test-coverage analyzer to monitor execution of the Ada code.

According to the vendor, Testgen costs $6,950.

Software Systems
3627 Padua Ave.
Claremont, Calif. 91711
714-625-6147

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MICRO BITS

Douglas Barney

Unix fervor overruns OS/2

This war is fun. Wars between real people with real weapons are too painful to be much fun. But companies vying for dollars is something few would do without. These skirmishes create better products at better prices and leave those that do not serve the customer as casualties.

There are still too many messy wars over land, politics and religion that should stop. But there is one I wish would never end: the fight for the desktop.

This conflict pits all the workstation vendors against one another and then lines these folks up against the personal computer vendors in search of high-end sales. Everyone, it seems, is an aggressor.

A surprising participant is the more than 20-year-old Unix operating system. Nobody used to care about this big batch of code. Until recently, the only people brave enough to use it were academic types with long scraggly beards. It seemed that the longer the beard, the more the person knew about Unix.

Today, neatly groomed yuppie stockbrokers, architects and

Continued on page 52

Microsoft biting its nose to spite its face?

BY DOUGLAS BARNEY
CW STAFF

REDMOND, Wash. — Microsoft Corp. recently defended its lagging OS/2 operating system against the Unix onslaught by describing an upcoming series of dramatic OS/2 enhancements, including the ability to run on non-Intel Corp. microprocessors. But at the same time, impending improvements to today's Microsoft Windows may cause OS/2 to lose even more steam.

The plans were presented last month to a contingent of reporters and analysts who trekked to Microsoft's headquarters here for a rundown of the firm's system software plans.

While continuing to see a bright future for its MS-DOS operating system, currently used by 25 million people, Microsoft officials described an environment in which MS-DOS can no longer cut the mustard.

Instead, users will run multiple, visually appealing applications simultaneously, often swapping data between programs on the fly. It is a world in which OS/2 and the Presentation Manager catch on. Clearly, company officials are talking about the future.

This future will not be limited to today's high-end PCs. In fact, Microsoft Chairman Bill Gates promised that OS/2 will run on non-Intel microprocessor-based machines. Gates, however, declined to offer a specific date.

Microsoft's Gates *against OS/2 wall*

Some of Microsoft's goals, however, are uncertain, while others are already starting to be met. Microsoft Windows, a product long in the making and with an even longer sales cycle, is now catching on. Microsoft claims that this graphical user interface is outselling Apple Computer, Inc.'s graphically oriented Macintosh computer. The company also claimed that key Macintosh applications will be available for Windows by next month.

Even though Microsoft is hot on OS/2, it will continue enhancing MS-DOS and Windows to serve the low-end market. Enhancements for both include the ability to operate with less memory and more support for multiple applications.

Continued on page 47

Stanford shells out Macs for oceanic studies, courseware

ON SITE

BY JULIE PITTA
CW STAFF

PALO ALTO, Calif. — There is a new arrival in San Francisco Bay, and it made its journey from Russia to California on foot.

The discovery was made by the engineering department of Stanford University, working with the U.S. Geological Survey on a study of the ecosystem of San Francisco Bay. The new settler is a hardy Russian clam whose main advantages are an ability to adjust to almost any environment and the single large foot it uses to propel itself.

Stanford and federal researchers discovered the immigrant using a highly sensitive measuring instrument called a velocity sensor, which records movement and is so sensitive that it can detect the vibrations of feeding clams. The velocity sensor is connected to an Apple Computer, Inc. Macintosh II.

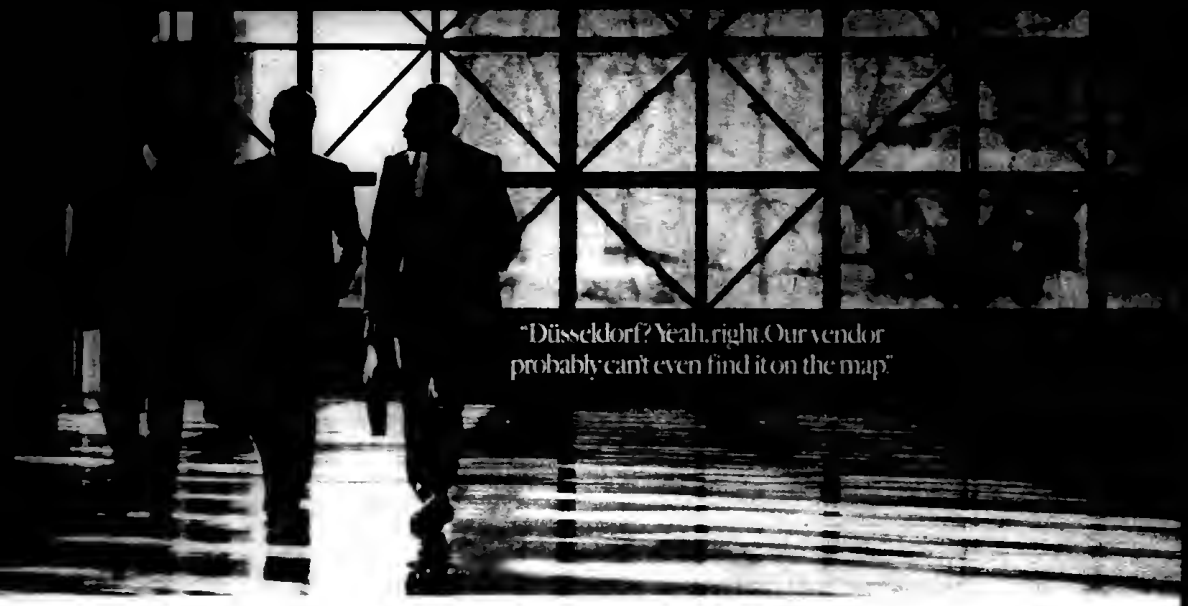
Using Labview, a program from National Instruments Co. that was modified by Stanford researchers, the Mac II can translate impulses sent from the velocity sensor into actual data. Once recorded, the data can be charted and graphed.

Clam feed

A new type of clam might not seem a significant finding. However, Stanford professors Jeffrey Koseff and Stephen Monismith said its appearance is likely to have a serious impact on the bay. While the two existing species of bay clams feed on the algae prevalent there, the Russian clam feeds on plankton, which has been a source of sustenance for certain kinds of Bay fish. Competition for plankton could change the bay's fish population.

"If you want to understand the San Francisco Bay ecology, you have to understand it from the ground up," Koseff said.

The Macintosh is playing a key role in Stanford's engineering department as both a research and an instructional tool, according to Robert Eustis, a mechanical engineering professor who manages the Mac program within the department. Engineering has 250 Macs today; another 200 are on the way.



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REVIEWS/NEW PRODUCTS

Mac IIX reveals moderate, not radical, improvement

Although not revolutionary, Apple Computer, Inc.'s Macintosh IIX is a firm step in the right direction. It features built-in memory management, a floppy drive that reads and writes all popular disk formats and an improved CPU performance that, in tests, far exceeded the announced 15% increase.

The Mac IIX is powered by a Motorola, Inc. 68030 processor that runs at 15.7 MHz. It is teamed with a Motorola 68882 math coprocessor.

The 68030 has memory management built in. The IIX's main logic board still has sockets for eight single LU line memory modules of random-access memory chips. The new read-only memory chips are now housed in a single SIMM socket in place of the four dual in-line socketed packages found in the Mac II.

Macintosh IIX

Price: $6,969

- Performance: Excellent
- Documentation: Very good
- Setup: Very good
- Ease of use: Excellent
- Serviceability: Fair
- Value: Very good

The other big change from the Mac II is the 3.5-in. high density floppy drive. With a new controller, it can read, write and initialize disks using Macintosh, MS-DOS and OS/2 floppy formats, the latter two via Apple File Exchange.

The Macintosh operating system has some new features, including Multifinder, which allows multiple applications to be open at the same time, and Macromaker, which can record and recall any combination of keystrokes and mouse action.

Although the

To page 43

Apple Computer's *Macintosh IIX*

Project Manager widens appeal

Software Publishing's Version 3.01 has features for pros, casual users

Software Publishing Corp.'s Harvard Project Manager II is often eclipsed by more sophisticated and lower cost project management packages. Version 3.01 offers enough significant features to appeal to professional planners but still serves casual users who enjoy the program's simple operation.

Harvard's unique new Fast Track mode lets business managers arrange tasks on a time line very quickly without entering unnecessary details.

New, more elaborate planning features for advanced users include individual resource calendars, penalty costs and quicker calculations.

Outline format

In addition to Fast Track plans, work can be organized into a familiar text outline form to augment the work-breakdown tree available in the previous version. Plans are also created directly on the Gantt chart or Program Evaluation and Review Technique (PERT) network. Finally, there is a forms-view feature to add details about many activities simultaneously.

You can switch among formats with one command. All methods are connected, so what you create in one window is reflected in others.

Project size is still limited by available conventional random-access memory. Subprojects help you deal with larger jobs. Resource-leveling occurs across all projects.

Version 3.01 offers an updated printer list that includes the Hewlett-Packard Co. Laserjet Series II, Deskjet and Paintjet and Calcomp Corp. E-size plotters. Printing speed has been optimized and offers 26 report types. You can group reports for batch printing.

Software Publishing's Harvard Project Manager II

Price: $695

- Performance: Satisfactory
- Documentation: Very good
- Ease of learning: Very good
- Ease of use: Good
- Error handling: Good
- Support: Good
- Value: Good

Other new features include import-export capabilities, three zoom levels and a Find command that shows how one task is related to other activities.

The Fast Track mode enables the user to design a project quickly, although editing is not always so straightforward.

The Work Breakdown Outliner lets you set 99 indentation levels (10 are visible). Levels and subordinate tasks move without disturbing their relationship. One extra touch is the customized code field, which adds to the preset Work Breakdown Structure numbering scheme.

Graphics are limited to the IBM extended character set. Any two charts or forms can appear using split windows. Subprojects also have constraints. For instance, they cannot be linked to a milestone. On the plus side, several options can create subprojects.

Needs at least 80286 PC

Harvard Project Manager 3.01 keeps you waiting with long calculation times and its general operation. You will want to run it on an Intel Corp. 80286-based PC, at a minimum. There is no provision during leveling to work on just a portion of the project or to manually override the system's decision to reallocate resources or postpone jobs.

Harvard Project Manager's manual combines general project management concepts with details about the program's operation. Included are an interactive tutorial, a quick reference card and a workbook for use in plan-

Continued on page 43

HP boosts resolution in Laserjet IID

Hewlett-Packard Co.'s new printer, the Laserjet IID, is based on the Laserjet Series II and features 300 by 300 dot/in. resolution and duplex capability, among other improvements.

The IID is designed around an 8 page/min Canon U.S.A., Inc. RX printer engine. The most visible change in the design is the addition of a second paper tray that doubles paper capacity to 400 sheets. An envelope feeder can also be attached.

To accommodate binding two-sided output on either the top or left edge of the page, the IID can print text on both sides of the paper in right-side-up position, or where the second side of each sheet is upside-down in both landscape and portrait orientation.

HP also improved font handling so that any font can be printed in landscape or portrait orientations. This model offers greater internal font choices, including Courier in 10- and 12-point medium, bold and italic styles as well as the 8-point Line Printer font. The IID's S2 font cartridge adds Times Roman in 8- and 12-point medium, bold and italic as well as 14-point Helvetica bold. The IID comes with two font cartridge slots. It has no font or macro limitations.

Laserjet IID

Price: $4,225

- Performance: Very good
- Documentation: Very good
- Ease of use: Very good
- Setup: Very good
- Serviceability: Good
- Value: Very good

The Laserjet IID ranks near the top of the list on all speed tests when printing single sided. When printing double-sided, it is still an impressive performer. Output quality is also very good, featuring smoothly formed text, legible type in small point sizes and solid print density.

HP already sports an impressive list of software using the IID's special features and has good font support. As with all Laserjets, the IID can emulate a standard line printer.

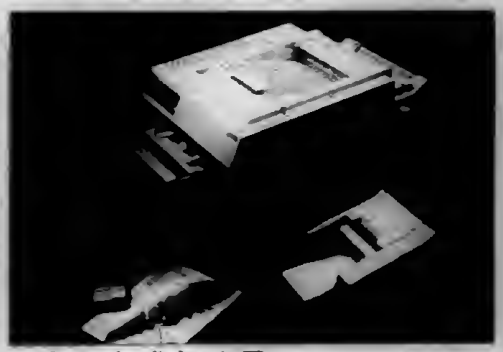
While the new features require more memory to implement, the standard configuration has been expanded to 640K bytes, leaving the same amount of random-access memory available to the user.

Documentation for the IID is complete and easy to understand. The binder-style user's guide includes a discussion of fonts, a troubleshooting guide with a description of all on-line error messages and front-panel operations, tips on using a few popular software packages and a detailed installation guide. A separate large-format, pictorial setup guide and quick-reference card offer easy access to specific information.

The IID features solid workmanship and rugged design. It comes with a one-year parts and labor warranty, with service handled through HP-authorized dealers or direct from the factory. A variety of extended service contracts are available.

HP also provides users with an unlimited, though not toll-free, technical support line. Technical support is available through HP or its dealers, and the service is accurate and helpful.

Despite its $4,225 price tag, the HP Laserjet IID is a good value, especially for users who want a full-featured laser printer but do not need the duty cycle and speed of departmental printers.



Hewlett-Packard's *Laserjet IID*

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Mac IIX

CONTINUED FROM PAGE 41

Mac IIX's 68030 runs at the same speed as the Motorola 68020 that powers the Mac II, several factors serve to enhance overall CPU performance. The first is the existence of a 256K-byte hardware data and instruction cache. This is in addition to a similar instruction cache that is also found on the 68020. Second, the 68882 math coprocessor is said to be twice as fast as the Mac II's 68881 chip, due to its efficient pipelining.

The built-in memory management unit (MMU) contains a subset of the 68881 instruction set but provides the same virtual-memory and memory-protection capabilities, which are necessary if you intend to use the A/UX operating system; it will also allow all Mac IIX systems to use future Macintosh multiprocessing operating systems without additional hardware. This built-in MMU also does memory address translations.

The Apple hard disks available for the IIX are the same as those available for the Mac II. The FDHD drive is no faster than the 800K-byte floppy drive found in the Mac II. You can realize improved performance, however, by using high-density disks that store 1.4M bytes.

We tested several software applications. Recalculations and sorts using Microsoft's Excel were faster by about 33% over the Mac II, but be sure to get Microsoft's patch that allows Excel to recognize the 68882. Scrolling tests showed improvements in the 25% to 38% range with Microsoft Word, Aldus Corp.'s Pagemaker, Aldus Freehand and Claris Corp.'s Macdraw II. All of the products worked as expected; you are advised to keep your software up-to-date.

The IIX's system board has room for 4M bytes of additional RAM for a total of 8M bytes. Further expansion is available thanks to the small computer system interface port, two serial ports, six full-length Nubus slots, two Apple desktop bus ports and a sound jack. There's another drive bay for a second floppy.

The Mac IIX is accompanied by eight disks, four manuals, a quick-reference card and a getting-started poster. The documentation is useful, well-written and easy to understand.

Setting up the IIX is no different than setting up a Mac II. External ports are clearly marked, and cables are simple to plug in. A single screw secures the lid, making it easier to open the system.

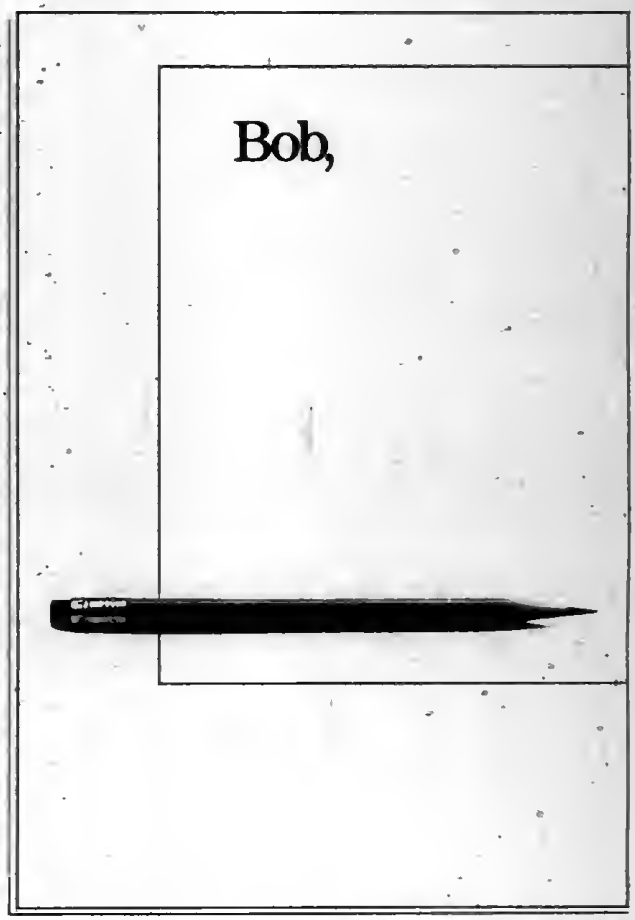
Apple provides a fine assortment of software tools for installing system software on your hard disk.

The IIX, with the current system software, is even easier to use than its predecessors. Features that add to ease of use include speed, Multifinder and the high-density floppy.

The Mac IIX comes with a 90-day warranty for defective parts, which is shorter than the standard one year for most personal computers. You may purchase extended coverage for up to three years.

Apple relies heavily on its authorized Apple dealers for support. Organizations with large numbers of systems can become, at no extra cost, "servicing owners" with the same access to Apple support as the dealers and even dealer prices on spare parts.

A IIX with 4M bytes of RAM and a single floppy drive has a list price of $6,969. With an 80M-byte hard disk, the price is $7,869. A kit that replaces a Mac II's floppy drive, controller and ROM costs $599. For an additional $2,199, you can replace the Mac II system board.



Project Manager

CONTINUED FROM PAGE 41

ning a project. Error message boxes give precise information about an error and how to correct it.

Installation is simple and, in keeping with many Software Publishing products, even advanced features are, for the most part, easy to learn. Context-sensitive, on-line help displays detailed instructions about the current form, chart or report. Screen forms are clearly organized.

Harvard Project Manager is one of the few PC-based packages that consolidate information from many projects into one report. However, ease-of-use enhancements and a generally solid design are offset somewhat by sluggish operation, the lack of some advanced editing capabilities and the distribution of some features throughout several menus.

Software Publishing offers unlimited non-toll-free telephone support with knowledgeable technical support people from 8 a.m. to 4 p.m. Pacific time, Monday through Friday.

Corporate site licensing plans, a newsletter, an electronic bulletin board system and training workshops are also available. Registered users receive low-cost updates.

At $695, Harvard Project Manager 3.01 is at the top of the price curve for its class. Creating a small project is relatively easy, but professional planners will be frustrated with the product's slow execution speed.

NEW PRODUCTS

Systems

Decision Data Computer Corp. has unveiled a line of personal computers designed to function either as independent computing stations or as workstations connected to IBM minicomputer systems, the company said.

The 16-MHz DDCC 5070 is reported to be an Intel Corp. 80386-based machine compatible with both the MS-DOS and OS/2 operating systems. It comes standard with 2M bytes of random-access memory and eight expansion slots and is priced from $2,795.

The DDCC 5053 PC features an Intel 16-bit 80286 microprocessor and operates at both 12 and 8 MHz clock speeds, the vendor said. It comes standard with 1M byte of RAM expandable to 16M bytes. The Intel 8086-based DDCC 5030 PC reportedly runs at 9.6 or 8 MHz and is offered with 640K bytes of RAM on the main system board.

The DDCC 5053 and DDCC 5030 are priced from $1,579 and $899, respectively.

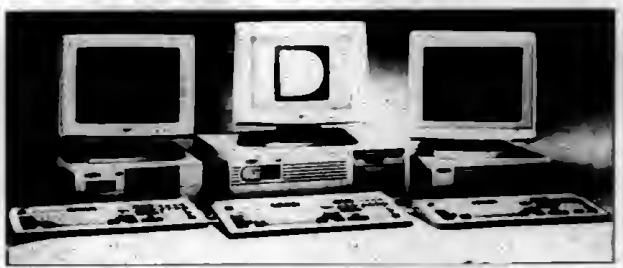
Decision Data
100 Witmer Road
Horsham, Pa. 19044
800-523-5357

Zenith Data Systems has unveiled a 25-MHz Intel Corp. 80386-based desktop workstation.

The Z-386/25 was designed to address the need for network file servers, engineering workstations, high-end business systems or Unix applications in a 386 environment, according to the company. The zero-wait-state system comes standard with 2M bytes of expandable memory and 64K bytes of cache.

The machine is available in four configurations: the Model 70 and Model 150 feature a 70M-byte and 150M-byte enhanced small device interface (ESDI) hard disk drive, respectively; the Model 320 reportedly includes a 16-msec, 320M-byte ESDI drive; and the Model 1 includes five expansion slots. Pricing ranges from $6,995 for the Model 1 to $11,999 for the Model 320.

Zenith Data Systems
1000 Milwaukee Ave.
Glenview, Ill. 60025
800-842-9000



Decision Data's *PC line*

Micro Express Co. has announced that it will no longer use LCD screens in its portable personal computers. According to the company, the entire line of portables will now incorporate gas plasma screens. Such screens have a typical lifetime of 50,000 hours, Micro Express said.

New pricing schedule for the Micro Express line of portables is as follows: The Regal II, a 20-MHz Intel Corp. 80386 machine, will cost $3,799; the 20-MHz Intel 80286-based Regal, with 1M byte of random-access memory, will cost $2,799; and the Regal 286 12-MHz computer with 512K bytes of RAM will be priced at $1,999.

All three machines carry a one-year warranty on parts and labor.

Micro Express
2114 S. Grand Ave.
Santa Ana, Calif. 92705
800-642-7621

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the toughest part
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BASF

Software applications packages

Instaplan Corp. has updated its project management software package for business applications.

Running on IBM Personal Computers, Personal System/2s and compatibles, Instaplan 2.0 incorporates multiproject outlining capabilities and a project-history database function, according to the company.

Instaplan 2.0 has a price tag of $99. It requires 640K bytes of random-access memory and a hard disk.

Instaplan
Suite 311
655 Redwood Highway
Mill Valley, Calif. 94941
800-852-7526

Quadram Corp. has announced plans to bundle Samna Corp.'s graphical word processor, Ami, with the QuadVGA Spectra graphics card.

According to Quadram, the three-quarter-size graphics card can be installed in IBM Personal Computers, XTs, ATs and compatibles, and comes with high-resolution drivers for Microsoft Corp.'s Windows, Aldus Corp.'s Pagemaker and other applications. When combined with Ami, the product will reportedly provide users with resolutions of either 800 by 600 or 1024 by 768 pixels.

The bundled product is available for $549 through May 31.

Quadram
One Quad Way
Norcross, Ga. 30093
404-923-6666

Buttonware, Inc. has announced upgraded versions of its spreadsheet and word processing packages.

According to the vendor, the PC-Type II Shareware word processor package has been enhanced to include a spelling checker with a 100,000-word dictionary and horizontal and vertical split-screen capabilities. It is priced at $89.95.

The PC-Calc Plus Version 2.0 spreadsheet, scheduled for release in April, will provide 45 additional statistical and financial functions. These include straight-line depreciation, declining balance and linear regression. It costs $69.95.

The packages require an IBM Personal Computer, Personal System/2 or compatible, along with two 720K-byte floppies or a hard disk.

Buttonware
Box 96058
Bellevue, Wash. 98009
206-454-0479

Macintosh products

Applied Systems and Technologies, Inc. said it has enhanced its Maxpage desktop publishing, page-makeup software package.

Version 1.2 of Maxpage reportedly includes a graphics adjustment function that allows imported pictures or paintings to be reduced as well as enlarged. Speed and text-handling functions have also been increased, according to the vendor. The program runs on Apple Computer, Inc. Macintosh computers and is priced at $89.

Applied Systems
227M Hallenbeck Road
Cleveland, N.Y. 13042
315-675-8584

Western Digital Corp. has added two higher capacity disk drives to its family of external Preference Hard Disk AP products for the Apple Computer, Inc. market.

Available in 80M- and 120M-byte capacities, the new drives measure approximately 3 in. high by 6.5 in. wide by 8 in. deep, according to the company. The series is compatible with both Apple II and Macintosh computers and also includes 20M- and 40M-byte storage configurations.

The 80M-byte version is priced at $1,695, and the 120M-byte drive costs $2,395. Both are scheduled for delivery in the second quarter.

Western Digital
2445 McCabe Way
Irvine, Calif. 92714
714-863-0102

A language tool kit for Apple Computer, Inc. Macintosh users has been announced by Abraxas Software, Inc.

The product reportedly allows the Apple Hypertalk object-oriented language to be embedded into software applications and runs in conjunction with the company's Macyacc software. Macyacc generates source code for building object-oriented language products.

The Hypertalk tool kit is included with Macyacc and is priced at $395.

Abraxas
P.O. Box 19586
Portland, Ore. 97219
503-244-5253

Ventel, Inc. has announced a 2,400 bit/sec. internal modem developed for Apple Computer, Inc. Macintosh II computers.

The Mac2400E Internal Modem is said to be Nubus-compatible and reportedly implements both X.PC and MNP Levels 2, 3 and 4 error-correction protocols. Features include autodial and auto-answer, automatic fallback and self-testing capabilities. The unit is priced at $449, which includes a five-year warranty.

Ventel
2121 Zanker Road
San Jose, Calif. 95131
800-538-5121

Ventel's *Mac2400E Internal Modem*

Development tools

Realia, Inc. has released Realia Cobol 3.10, an enhanced version of its optimizing Cobol compiler for the IBM Personal Computer and Personal System/2 series, the vendor said.

The upgrade reportedly includes a transactional file-sharing utility that allows Realia Cobol applications to access files in a network and also guarantees sequential consistency. The latest release is priced at $995, and registered 3.00 users under maintenance contract will receive a free, automatic upgrade.

Realia
10 S. Riverside Plaza
Chicago, Ill. 60606
312-346-0642

Data storage

Peer Protocols, Inc. has announced the Peer-1000 series of IBM Personal Computer AT tester products. The devices were designed specifically for testing hard disk drives that have embedded AT controllers.

A technical mode is reportedly provided to allow interactive test sequence preparation using menu selections. The products are available in configurations to accommodate from one to four drives and are priced from $1,950 to $4,950.

Peer Protocols
Suite 101
3176 Pullman
Costa Mesa, Calif. 92626
714-662-1929

Pliceon, Inc. has expanded its family of 32-bit, 1M- and 4M-byte Superam Memory Modules.

According to the vendor, the 4M-byte, 32-bit Superam System Memory Boards were designed specifically for Compaq Computer Corp. 386 and 386/20E machines. The boards reportedly can be combined with either Pliceon or Compaq memory modules for a total system memory configuration of 13M bytes in the Compaq 386 and a maximum 16M bytes for the 386/20E. The memory boards are priced at $2,579 each.

Pliceon
P.O. Box 61730
San Jose, Calif. 95161
408-432-8030

Board-level devices

Data Translation, Inc. has announced an IBM Personal Computer AT-compatible board that is capable of capturing, processing and storing up to four 512- by 512- by 8-bit images from standard video or slow-scan devices in real time, according to the company.

Targeted for high-speed processing-intensive applications, the DT2862 Arithmetic Frame Grabber incorporates 1M byte of on-board memory, a built-in 8-bit

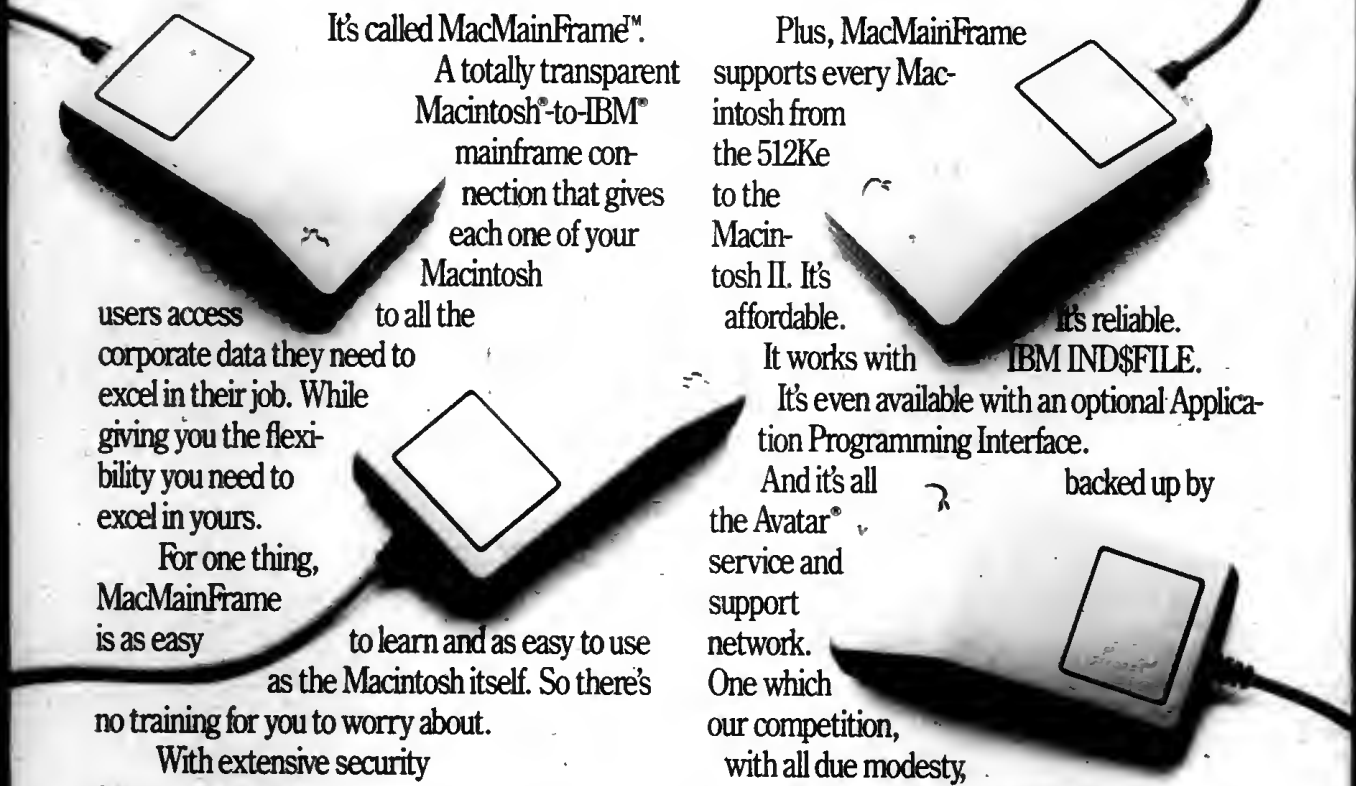
Data Translation's *board*

arithmetic logic unit and high-speed data ports for connection to dedicated processor boards, according to Data Translation.

The DT2862 Arithmetic Frame Grabber is priced at $3,995.

Data Translation
100 Locke Drive
Marlboro, Mass. 01752
508-481-3700

For once, a micro-to-mainframe link that will cure your fear of mice.



It's called MacMainFrame™. A totally transparent Macintosh®-to-IBM® mainframe connection that gives each one of your Macintosh users access to all the corporate data they need to excel in their job. While giving you the flexibility you need to excel in yours.

For one thing, MacMainFrame is as easy to learn and as easy to use as the Macintosh itself. So there's no training for you to worry about.

With extensive security features, MacMainFrame lets you decide precisely who can and who can't get into your data. Which information is accessible and which isn't. So you don't have to worry about your mainframe being – if you'll pardon the expression – overrun with mice.

Plus, MacMainFrame supports every Macintosh from the 512Ke to the Macintosh II. It's affordable. It's reliable. It works with IBM IND$FILE. It's even available with an optional Application Programming Interface.

And it's all backed up by the Avatar® service and support network. One which our competition, with all due modesty, would be hard pressed to duplicate.

If you'd like the name of the authorized MacMainFrame dealer nearest you, call 1-800-289-2526, extension 28. Or write Avatar Corporation, 65 South Street, Hopkinton, MA 01748. Admittedly, you could give your Macintosh users something less than MacMainFrame. But wouldn't that be just a little bit scary?

Avatar

Now Macintosh II users can run up to five host sessions simultaneously with MacMainFrame/DFT.

Microsoft

CONTINUED FROM PAGE 39

Some now believe that these enhancements, particularly for Windows, will dramatically slow the transition to OS/2 and Presentation Manager. Windows 3.0, which was demonstrated at the seminar, opens up the memory space of MS-DOS by running in the so-called protected mode, a feature of Intel 80286 and higher chips that provides up to 16M bytes of random-access memory.

This protected mode is exactly the selling point of Presentation Manager, except that it will require about 2M bytes of RAM just to load itself. Windows, on the other hand, will be able to use this memory for data and programs.

Many now view the Windows strategy as a stopgap measure that will enhance the usability of PCs while OS/2 struggles for acceptance. Rod Zimmerman, marketing chief at Gupta Technologies, Inc., which is developing for Windows, wonders if users will move to Presentation Manager, given Windows' upcoming tweaks. Nonetheless, Gupta is deep into a port of its SQLwindows development system to the Presentation Manager.

OS/2 sales are currently lagging for several reasons, chief among them being the lack of compelling applications. Many are also waiting for a version that exploits the 32-bit capabilities of the Intel 80386 chip, a promise that will not be fulfilled until next year, Microsoft said.

Microsoft also promised that 22 Presentation Manager-specific applications will begin to ship in the first half of this year. These include Micrografx, Inc.'s Designer, a version of Microrim, Inc.'s R:base, Gupta Technologies' SQLwindows, Blyth Software, Inc.'s Omnis Quartz, Dataease International, Inc.'s Dataease OS/2, Aldus Corp.'s Pagemaker, Microsoft's Excel and Digital Research, Inc.'s GEM Draw.

A sore point for many users has been MS-DOS' rather primitive file system, which allows only eight-character file names. That will change with a high-performance file system that is also more flexible. The system will be able to create huge disk partitions and will allow users to name files with more intuitive, longer names.

More important than long file names nowadays is security. OS/2 chief architect Gordon Letwin disclosed the firm's goal of developing a file system to protect against viruses and ensure data privacy.

Microsoft is also pushing its new GPI, an imaging model obscured so far by OS/2's other features. GPI offers advanced area filling, color management and curve and line drawing as well as font rendering and management, all of which will be exploited over time by software vendors.

MANY NOW VIEW the Windows strategy as a stopgap measure that will enhance the usability of PCs while OS/2 struggles for acceptance.

GPI will also eventually do battle with Adobe's popular Postscript page description language. QMS, Inc. plans to ship a GPI laser printer in small quantities later this year. Like Postscript, GPI will be able to run on the printer itself for more efficient operation.

But in order for GPI to succeed, Presentation Manager applications will have to catch on. GPI will also battle Adobe Systems, Inc.'s Display Postscript as a screen description language.

Microsoft also promised to enhance its still unshipped SQL Server database server with transparent distributed updates and transparent distributed queries.

Gates knows no fear

At its recent System Software Seminar, Microsoft officials tackled head-on the threats to OS/2 posed by Unix and Apple's Macintosh.

Contrary to the belief of an increasing number of pundits that Unix will steal OS/2's thunder, Microsoft remained firm. Company Chairman Bill Gates maintained that Unix has so far only been successful in multiuser applications and niche markets such as academic research and engineering.

He ought to know. Through its partners, Microsoft has probably shipped more copies of Unix than anyone. Gates argued that, up till now, Unix has not made much headway as a standard operating system for the desktop. With the various versions of Unix kicking around and the wars over a common interface, software developers do not know where to turn, he said. Still, with an increasing industrywide level of support for Unix, Microsoft will have to work doubly hard to establish OS/2.

The slow pace of desktop software development for Unix will allow OS/2 to gain the upper hand, Microsoft officials said. But even if Unix does cripple the OS/2 market, Microsoft is well-positioned. Besides its Xenix and other offerings, the firm plans to ship a Unix-based version of OS/2 Presentation Manager by the first quarter of next year. The product will reportedly provide a high level of compatibility with OS/2 Presentation Manager applications.

According to Gates, the Macintosh has been successful in niche markets such as desktop publishing but stands little chance of taking the market away from the world of IBM Personal Computers and compatibles. Two issues will keep the Mac at bay, Gates argued. First, the Mac is only available from a single vendor. Perhaps more importantly, the Mac has run into technical limitations such as its inability to multitask and its primitive networking. Microsoft, however, remains the leading software vendor in the Mac market.

DOUGLAS BARNEY

PCs gain Hypercard-like features

BY SALLY CUSACK
CW STAFF

SYRACUSE, N.Y. — Software that brings features similar to Apple Computer, Inc.'s Hypercard to IBM Personal Computers and compatibles has been introduced by Brightbill-Roberts and Co.

Called Hyperpad (the pad part stands for personal application designer), the package's features include information-filled fields and buttons that can be moved, cut, pasted and linked associatively, the vendor said.

According to Infocorp, a market research firm in Santa Clara, Calif., there are currently 20 million DOS-based PC users in the U.S., with an additional 50 million users that will purchase the machines during the next six years.

"These are the folks we're after, those with the 286-based machines on down," said Steve Brightbill, president of Brightbill-Roberts. "We have designed a product with an open authoring system architecture that can be customized for either the casual user or the serious corporate developer."

Hyperpad uses buttons, fields, pages and other objects to build personal application designs, thereby allowing users to personalize their PC interface, create training materials and manage corporate and personal information.

The package provides screen-painting functions for layout design and an object-oriented, Hypertalk-like scripting language. The language reportedly can be used to create custom databases, interactive tutorials, corporate PC interfaces and a variety of other applications. It can also be configured as a front end to corporate mainframes or as a data entry interface to several DOS applications.

The user may elect to use either a mouse or the keyboard. The product does not require a graphics card.

The package is scheduled to ship in 30 days and is priced at $100. It will be sold directly by the company and distributed through retailer channels.

Brightbill-Roberts' *Hyperpad program*

Computers drafted in drug war

BY SHARON BAKER
CW STAFF

Barbara Thomas, a professor of nursing at the University of Iowa, has enlisted computers in the war against drugs.

Thomas, who uses computers to augment her own nursing research, is the author of a computer-assisted instruction (CAI) program about cocaine abuse. The program is published and marketed by Substance Abuse Education, Inc., which is a division of Medi-Sim, Inc., an Edwardsville, Kan.-based company that develops health education software.

Called Substance Abuse CAI, the $39.95 package consists of four modules and is sold to elementary and junior high schools across the country. It is also sold to private organizations that use it to enhance their drug education programs.

Personal concern

Thomas chose to concentrate on the topic of drug abuse because of her personal concern about the subject.

Drug abuse is also a sensitive subject that students may prefer to learn about on an individualized basis, which is the primary appeal to her program, according to Thomas.

"It's just between the student and the computer as to what information the student wants [to learn], and that might take some of the embarrassment out of talking about [drug addiction] in class," she says.

The interactive software, which can be used on an Apple Computer, Inc. Apple II as well as on IBM Personal Computers and compatibles, explains concepts such as abuse, addiction and withdrawal; lists the hazards of using any form of cocaine; describes the development of dependency on the drug; and identifies the physiological and psychological effects of cocaine use.

University of Iowa's Thomas

In addition to tutorial elements, the package includes a simulation, complete with color graphics, that gives the user an up-close view of the outcomes of cocaine addiction.

Helps teachers, parents

In addition to teaching students about drug abuse, the program may also help teachers and parents initiate a discussion of the topic after a student has used the package, Thomas says.

"There's an awful lot of talk about drug education, but there aren't very many teachers that feel comfortable with it," she says.

However, she stressed that the package should only be used to augment classroom instruction on drug abuse, not replace it.

The product is an outgrowth of a series of programs Thomas created between 1984 and 1986 for nursing education. The programs were part of a microcomputer project funded by a $390,000 grant from the Bureau of Health Profession's Division of Nursing in Washington, D.C. The programs were concerned with marijuana, alcohol and psychoactive substances, which include cocaine.

Thomas says she hopes to take a developmental leave of absence from the University of Iowa next year to research whether her programs are actually changing students' behavior or attitudes toward substance abuse.

Mosaic trying to best Lotus' 1-2-3

CAMBRIDGE, Mass. — A spreadsheet maker that gained fame from being sued by Lotus Development Corp. has now tried to do Lotus one better. Mosaic Software, Inc. has released a new version of its Twin spreadsheet software that it claims offers an alternative to the still unshipped Release 3.0 of Lotus' 1-2-3.

Dubbed Twin Level III, the personal computer-based product reportedly runs on IBM Personal Computer XTs, unlike 1-2-3 Release 3.0, which will require an Intel Corp. 80286 or faster microprocessor.

Twin Level III requires 375K bytes of memory and will not need a hard disk, according to Richard Bezjian, president of Mosaic. It is fully compatible with 1-2-3 Versions 1A and 2.0.

Reaching beyond

Bezjian said the limited hardware requirements of Twin Level III will allow his company to satisfy a substantially larger market than potential 1-2-3 Release 3.0 users. "Lotus' Version 3.0 will be a disappointment to many people," Bezjian said. "It will require a DOS extender, an Intel 80286 or 80386 machine and a hard disk. Folks using the XT or vanilla PC won't be able to use it, which is definitely to our advantage."

Twin Level III offers several capabilities not currently found in other spreadsheet packages, Mosaic said. Chief among these are the program's user-definable functions, which allow the user to build and define any function without the aid of compiling and debugging add-on kits. The program also includes several functions similar to Microsoft Corp.'s Excel, including file linking, three-dimensional capabilities and pull-down menus.

Features that are not expected to be found in Release 3.0 include the ability to define function keys and display their definitions on screens at all times. The amount of memory available is also constantly displayed. Finally, users can program Twin III to save files automatically at predetermined times.

Minimum recalculation and background recalculation speed-enhancement functions have also been incorporated into the product, Mosaic said. Those features are intended to save time by recalculating only spreadsheet cells that have been changed and by allowing the user to work in the foreground while recalculation continues.

Lotus sued Mosaic and Paperback Software, Inc. in Berkeley, Calif., in 1986 for allegedly copying the look and feel of 1-2-3. Neither case has come to trial.

Twin Level III is currently available for $249.

Samsung airs diskless workstation

SAN JOSE, Calif. — Samsung Information Systems America has announced a 12-MHz diskless workstation that is based on the Intel Corp. 80286 microprocessor.

The PCterminal/286 has four expansion slots and comes standard with 640K bytes of random-access memory, expandable to 15M bytes, according to the vendor.

The workstation also includes a Novell, Inc. Netware-compatible boot-programmable read-only memory that allows it to boot directly from a Netware file server. The CPU can run at either 6 or 12 MHz.

According to the company, the expansion slots allow users to install other network interface cards in one of the available slots.

Support is also available for IBM Enhanced Graphics Adapter and Video Graphics Array interfaces.

The PCterminal/286 is slated for delivery in the second quarter and will carry a price tag of $1,795, according to the vendor.

Which com

- Binary-compatible UNIX systems with the
- Delivered the most RISC processor

pany has:

broadest range of performance levels?
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Intergraph's open UNIX® systems offer 4 to 20 MIPS performance and compatibility at the binary level. So, software running on one of our current workstations or servers will run on all future products. That means your investments are protected in applications software, databases, and personnel training. Plus, you can optimize workload to each particular workstation. And yes, we've shipped more than 20,000 CLIPPER® RISC processors.

To learn more about our binary-compatible UNIX systems, call 1-800-826-3515 in the U.S., 31-2503-66333 in the Netherlands, or 852-5-8661966 in Hong Kong.

INTERGRAPH

Barney

FROM PAGE 39

designers use Unix. And in many cases, they appear to like it.

Now, every vendor and his mother are out pushing Unix on fast, visually appealing workstations. Prices are going down, power is going up, and customers are getting happy. Even DEC is doing some smart things on the desktop.

This is bad, bad timing for Microsoft, with its lagging effort to kick workstations where it hurts — right in the operating system.

Understanding that MS-DOS finally ran out of gas about five years ago, Microsoft began crafting its eventual replacement.

But the firm took too long to overbuild the new operating system, OS/2. Now OS/2 is being threatened by the ill-mannered Unix hordes that are snatching away desktops with reckless abandon.

Despite the disarray among Unix vendors and the fact that there will probably never be a standard, Unix is taking a hunk out of OS/2's backside. That is because Unix has everything that OS/2 has: support for a large memory, a graphical interface and multitasking. It also has what OS/2 wants: applications.

It's time for Microsoft to fight back with applications and OS/2 enhancements. But instead, the company itself is cannibalizing OS/2.

Microsoft is hopping on the Unix bandwagon with a major investment in Xenix distributor The Santa Cruz Operation, which has just finished a major rewrite of Unix for Intel's 80386 and is pitching in with a definition of the Open Software Foundation look and feel.

The OS/2 camp is relying on Intel to continually boost the speed of its 386 chip and get the 80486 and whatever other numbers out the door.

The Unix camp couldn't give a hoot about specific chips. They've got a selection of exciting chips with sleep-inducing names like Sparc (Sun's Scalable Processor Architecture), Motorola's 68030 and 88000 and Intel's I860.

OS/2 isn't dead yet. It just looks peaked and wheezes a lot. Meanwhile, Unix still has its share of problems that OS/2 may exploit. In particular, Unix is hanging on to arcane and ridiculous commands that users have to know to fully exploit its power.

Sounds like a good war to this correspondent.

There are three sides to every story. Every time an announcement is made, the vendors gather marketing types to describe how the product is in tune with the market and technical types to explain the breakthrough in terms only a theoretical physicist could understand.

It is often only months later, at a sordid industry conference, that company officials caught off-guard explain what really happened.

Don't believe it? Then read the following examples.

• The Extended Industry Standard Architecture (EISA) announcement.

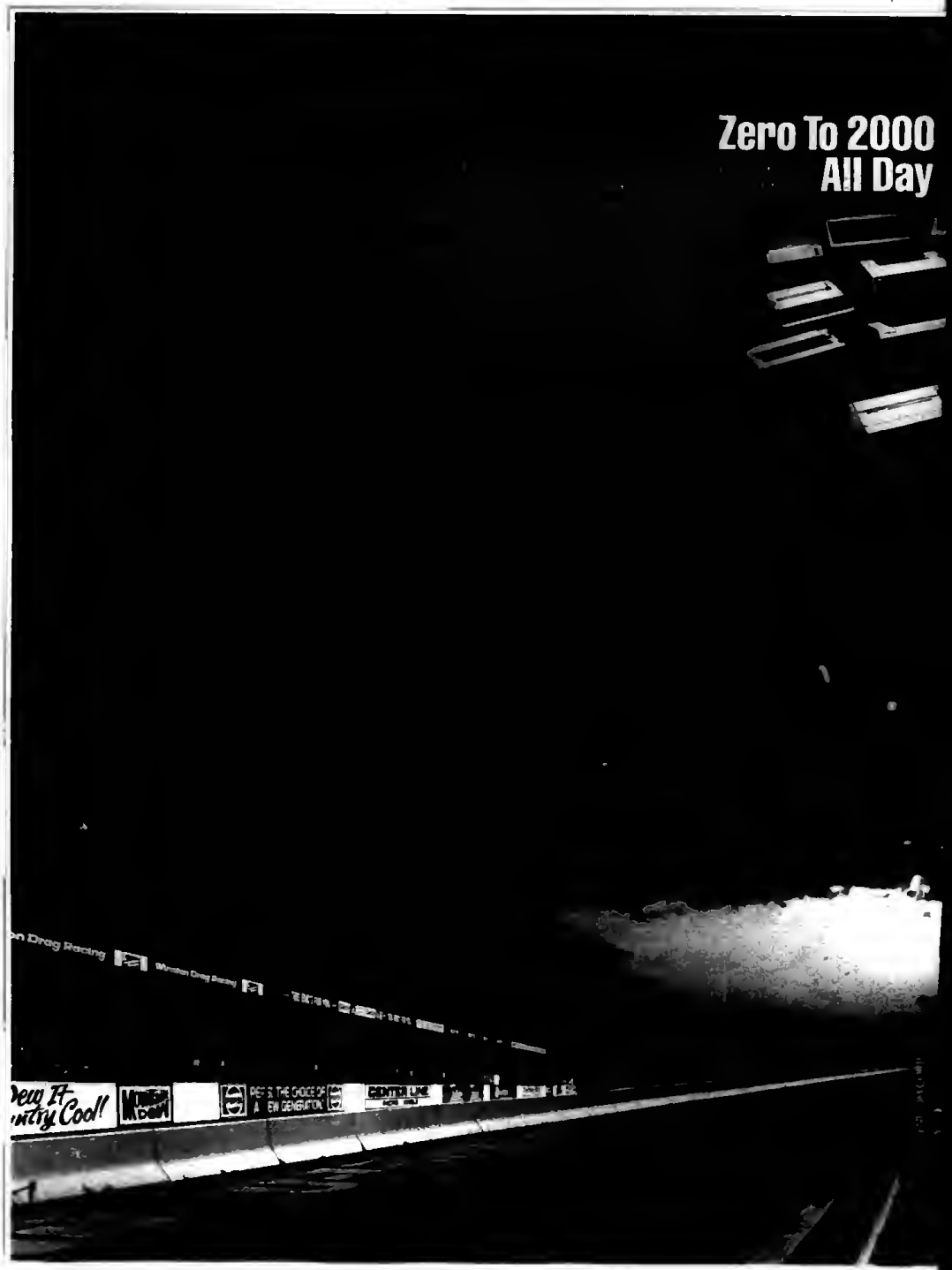
Marketing says, "Users asked us to develop a system that would preserve their investment in old boards with a system that is more advanced than the IBM Micro Channel Architecture and that will ship in a timely fashion. We've done that and more with the EISA bus, thanks to the input of every single one of our customers."

Techies say, "Without disk-caching, the Micro Channel bus master, which is mainly a 16-bit chip anyway, is slow compared with the throughput our large boards will give — nanosecond-wise, anyway."

What the EISA guys would admit if really honest: "IBM is going to charge us to clone the Micro Channel, which is hard to do anyway, so we thought we'd do something different. Besides, our customers are too stupid to care that we'll ship three years after IBM. After all, we control the market, uh, don't we?"

• Microsoft's Presentation Manager.

Marketing says, "Users asked us to develop a state-of-the-art interface that will cod-



dle end users while giving more power than any human ever needed."

Techies say, "With the inclusion of a new imaging model, your Bezier curves look better than Bo Derek's, especially when the interprocess communications running in protected mode are threading real-time p-code your way via the unlimited I/O that advanced buses allow."

What they would admit to on the q.t.: "IBM asked us to write the biggest MIPS sucker possible so they could sell PS/2s with lots and lots of expensive memory."

- Lotus's 1-2-3, Release 3.0.

Marketing says, "Users asked us to develop a state-of-the-art spreadsheet that is fully compatible for the most part with the millions of billions of models designed by our precious customers, while at the same time giving customers features that they have not even thought to ask for. Of course, the small business market will love the fact that it runs on a $12 million IBM 3090."

Techies say, "We've optimized the scheduling algorithms and, of course, stretched the limits of the hexadecimal underpinnings of interrupt 8905 to provide, shall we say, a bandwidth like no other."

What they would admit if pressed for the truth: "If you must know, we wrote the thing under OS/2 and couldn't squeeze it back into DOS. Now are you satisfied?"

Barney is a *Computerworld* senior editor, PCs and workstations.

PC users can expand to work groups

BY MICHAEL ALEXANDER
CW STAFF

Looking to expand into work group and departmental computing but unwilling to give up on your investment in personal computer hardware and software?

Zenith Data Systems has introduced a family of work group systems called the Z-1000 that use multiple Intel Corp. 80386 microprocessors, a 32-bit memory bus and an IBM Personal Computer AT peripheral bus that accepts PC XT and AT add-in cards.

The system's multiprocessing environment is suited for Microsoft Corp. and The Santa Cruz Operation's Xenix operating system, according to the company. It can also run multiple MS-DOS applications concurrently with conventional Xenix processes.

There are five configurations of the Z-1000 system. Each system is equipped with a 20-MHz 80386 base processor to handle such functions as booting the system, running the operating system kernel and handling AT peripheral devices.

Accommodations for five

As many as five more 80386 application processors can be added to accommodate more users, handle more demanding applications and deliver faster system throughput. Each application processor card includes an Intel 80387 coprocessor socket and can drive up to 32 serial devices.

In addition to the base processor, all five Z-1000 models are equipped with at least 4M bytes of memory, expandable to 64M bytes; a 150M-byte tape drive; a 5½-in., 1.2M-byte floppy disk drive; a 540W uninterruptible power supply; and a console terminal.

The Z-1000 is modular, enabling users to expand the system with more memory and disk drives. Each has four full-size and two half-size small computer systems interface disk drive bays and can also accommodate an expansion chassis to add five more full-size disk drive bays.

The systems cost between $19,900 and $59,300, depending on the configuration. For example, the Model 300 with the base processor, two additional 80386 application processors, 4M-byte memory and 300M-byte removable disk drive has a suggested retail price of $22,400.

All five models will be ready for shipment in May, the company said.

Future holds MS-DOS for Unix users

BY WILLIAM BRANDEL
CW STAFF

It may not be long before workstation users have the option of running any of the estimated 40,000 MS-DOS applications on their Unix machines without needing any help from Intel Corp. microprocessors.

Under most curreot circumstances, engineering-style applications are run on workstatioos. However, with the lack of commercial Unix applications, many day-to-day operations such as word processing and spreadsheets must be performed on the personal computer.

Hardware coprocessors — which put Intel processors to work as sidekicks to the workstation's main CPU — have been available for some time, but their $1,000-to-$1,500 price tag is daunting. This may change with the emergence of low-cost software emulators that provide a PC-DOS environment within a Unix session. Two companies — Hunter Systems, Inc. and Phoenix Technologies Ltd. — have come up with ways to emulate the Intel chip in software.

Phoenix, located in Norwood, Mass., markets a product, VP/ix, that emulates a PC environment in a pop-up window. The Phoenix offering essentially traps the calls a software package makes that are specific to the Intel chip and translates them into the requests that can be understood by the workstation processor. The software will run more slowly, but with this product, virtually every DOS application can run on the Unix workstation.

"They just plug in a diskette, play it and run — seamlessly," said Rich Levandov, Phoenix's vice-president of marketing.

A binary-code translation product called XDOS is sold by Hunter Systems in Mountain View, Calif. Its technique involves recompiling the entire MS-DOS application. While the recompiled versioo of the application in Unix mode renders significantly faster performance, there are only a handful of DOS applications that run with XDOS. These include Lotus Development Corp.'s 1-2-3, Ashton-Tate Corp.'s Dbase III Plus and Multimate Advantage II, Wordperfect Corp.'s Wordperfect, Microsoft Corp.'s Word, Microrim, Inc.'s R:Base 5000 and IBM's Displaywrite.

XDOS creates a Unix application programming interface, which essentially gives the programmer one common Unix interface to which to write the application — as opposed to recompiling the DOS application to the differing flavors of Unix.

Different pricing

The pricing structure for the two software emulators is different. XDOS costs $50 per package, while the cost of the Phoenix emulation code is often bundled in with the system by the seller. Purchased separately, the Phoenix emulation software costs between $295 and $595.

While XDOS is being sold with Motorola, Inc. processor-based systems, Levandov said that workstation vendors such as Digital Equipment Corp., Apple Computer, Inc., Apollo Computer, Inc., Hewlett-Packard Co. and Solbourne Computer, Inc. have licensed Phoenix's emulation software.

Levandov noted that, in addition to the leading workstation vendors, 20 other firms that do not currently make workstations are licensing their IBM BIOS code and emulation software to get into the workstation business. He expects there to be 25 different brands of workstations with a DOS coprocessing option on the market in the next year.

Hunter Systems Director of Marketing Patricia Yelvington said the firm is targeting the high-performance market, while the Phoenix approach is geared toward ease of use.

"In a multiuser environment, you have to have that performance," she said. "The emulator approach is too slow." Yelvington conceded that few DOS applications will run with XDOS, while most DOS applications will run with Phoenix's disk.

DATA STREAM

Jeffrey N. Fritz

Look at ISDN CPE

The selection of customer-premise equipment (CPE) is an important but strangely overlooked part of Integrated Services Digital Network (ISDN) implementations. The user serves his company well by taking a careful look at what is currently available on the market.

Few decisions are of more importance to the success of the ISDN network. But not all ISDN equipment offers the same features; capabilities vary from company to company and from device to device.

CPE is the telephone company's jargon for equipment owned by the customer. In the analog world, it is the office telephone system, including any modems. In the ISDN world, it splits into three major devices:

• Desk sets. We used to call them telephones. Now they have a new handle, since they carry digitized voice and can have LCDs. They also have a fair amount of processing power built in for voice digitization and communication with the central office's digital switch. Many ISDN desk sets come complete with at least one RS-232 port

Continued on page 60

No backup available if sharks get hungry

BY JAMES DALY
CW STAFF

A recently installed fiber cable linking Europe and the U.S. East Coast may boast a solid one-two punch with its muscular data-carrying capacity and swift transmission speeds. But some industry sources are warning users of the world's first trans-oceanic digital connection not to fall too deeply in love with the new line — at least for now.

The reason? A backup fiber link for the TAT8 cable is not scheduled to be operational until late 1991. If TAT8 fails, users may have to switch back to satellite, which is said to be inadequate for some transmissions.

"There are some applications you just can't flip over to a satellite," said James F. Cofield, director of international marketing at The Aries Group-MPSG, a data and voice network design firm in Rockville, Md.

When TAT8 became operational in mid-December, it provided the first trans-Atlantic alternative to satellite-based digital communications. TAT8's 560M bit/sec. transmission rate doubled the existing trans-Atlantic capacity and offered higher capacity than satellite links.

Despite early problems — sharks gnawing on a previous undersea fiber cable shorted it out several times, and one leg of TAT8 recently failed — the line has been well-received.

One key selling point for TAT8 is that fiber is free of the transmission delays that sometimes plague satellite networks. But therein lies the rub of the current backup problem, particularly for sites that use IBM's Systems Network Architecture (SNA). Under SNA, host trans-

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Inside

Cincom uses host to route PC software

BY JEAN S. BOZMAN
CW STAFF

CINCINNATI — Cincom Systems, Inc. is offering MIS a personal computer software distribution product that uses the mainframe as an electronic post office to send copies over the corporate network to desktop users.

Late last month, Cincom announced Network Navigator, a distribution product that resides in part on an IBM mainframe and in part on the end user's IBM-compatible PC. The idea, product manager Mark Masson says, is to let MIS handle the upgrades for all the users covered by a site license. Navigator runs in three IBM operating environments: MVS/SP, MVS/XA and VM/CMS. Applications can be sent to users across operating environments, Cincom said.

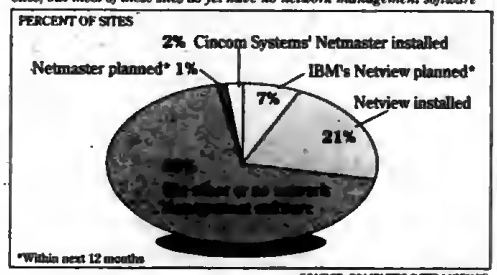
Navigator complements Cincom's Netmaster series of communications products, said Ronald R. Hank, a Cincom spokesman. Netmaster, which takes on the role of IBM's own Netview network manager product, enables Navigator to distribute software over the network.

"If you want to ship an enhancement out to your user base, you usually have to physically copy the new version onto individual disks," Masson said.

Continued on page 58

Room to grow

Cincom's Netmaster is dwarfed by Netview at 8,000 surveyed IBM UTAM sites, but most of these sites as yet have no network management software



SOURCE: COMPUTER INTELLIGENCE
CW CHART: DOREEN DAHLE

Microsoft's LAN Manager plans seep out

BY PATRICIA KEEFE
CW STAFF

BOSTON — Bits of information are slowly creeping out concerning Microsoft Corp.'s 1989 plans for extending LAN Manager.

1988 was a heady year for Microsoft's OS/2 file server technology. It not only snagged a hefty number of big-name supporters — including Digital Equipment Corp., AT&T, Hewlett-Packard Co. and 3Com Corp. — but also managed to bask, whether deservedly or not, in the glow of its association with IBM and its LAN server.

These accolades aside, Microsoft has targeted plenty of

Continued on page 59

Fiber-optic to light up LAN market

KMI report sees purchase patterns shifting to favor Token-Ring, FDDI

BY ELISABETH HORWITT
CW STAFF

NEWPORT, R.I. — Fiber-optic local-area network sales are predicted to grow a whopping 47% per year on average, according to a recent report from Kessler Marketing Intelligence (KMI).

Dominant vendors are set to provide Fiber Distributed Data Interface (FDDI) products, according to the research firm. At the same time, buying patterns in that market will shift drastically, away from Ethernet networks and toward Token-Ring and FDDI products, the company predicted.

"No question but that fiber-optic LANs are now the hottest part of the fiber industry," KMI President John Kessler said. KMI has never observed comparable growth in any other fiber segment, except when AT&T, U.S. Sprint Communications Co. and MCI Communications Corp. were racing to convert their long-haul networks to fiber, he added.

The total fiber LAN market is predicted to grow from $25.4 million in 1987 to $319.1 million in 1993, the report said.

Revenue in the fiber-based Ethernet sector, which totaled $18.8 million in 1987, will grow by almost 300% to $73.8 million in 1993, KMI said. While this is a sizable leap, Ethernet fiber LANs will steadily lose market share to high-speed fiber LANs, which are predicted to shoot up from $2.9 million in 1987 to $126.5 million in 1993, according to the report.

Higher FDDI availability

A major portion of the high-speed LAN market will be 100M bit/sec. FDDI products, which will become increasingly available as major vendors bring their offerings to market, KMI said.

Right now, only two vendors offer FDDI products: Fibronics International, Inc. and In-Net Corp., according to KMI. Apollo Computer, Inc. recently announced an FDDI offering, and a number of vendors have promised such announcements in the near future, KMI said, including IBM, Digital Equipment Corp., Digital Communications Associates, Inc., 3Com Corp., Proteon, Inc., Fibercom, Inc., Raycom Systems, Inc. and Artel Communications Corp.

Fiber-based Token-Ring products will also grow during the next five years, KMI said, from $2.1 million in 1987 to $118.6 million in 1993. Ethernet's comparatively low growth, compared with fiber-based Token-Ring offerings, reflects the fact that users initially bought Ethernet as an easily implementable system but increasingly demand Token-Ring's ability to "add many more workstations than with Ethernet and also offer improvement in collision detection," Kessler said.

Still to come

While IBM has promised a future FDDI announcement, the company is still recommending shielded twisted-pair cable for its 16M bit/sec. Token-Ring network and relegating fiber to backbones that connect multiple LANs, Kessler said.

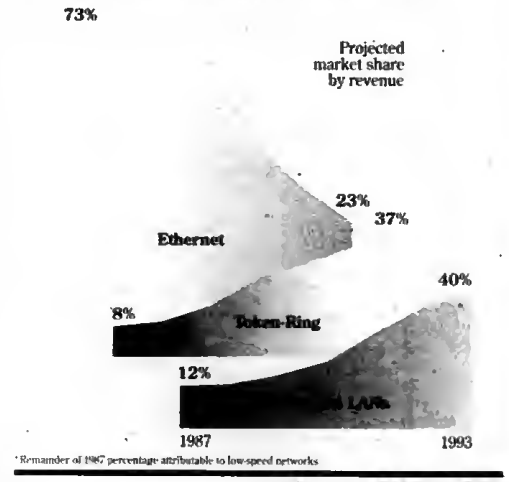
Broken down by industry segment, the fiber LAN market in 1988 was made up of 29% corporate installations, 22% government, 16% financial, 15% education, 13% military and 5% other, including manufacturing and medical sectors, according to KMI.

The research company expects strong growth in the manufacturing sector during the next few years, as factory networks demand the higher bit/sec. rates and freedom from electromagnetic disturbance that fiber offers, Kessler said.

Financial institutions, because of their security concerns, will also turn increasingly to fiber's comparative resistance to break-ins, he added.

Fiber LAN market penetration

*Ethernet systems will shrink as a percentage of the fiber optics LAN market while Token-Ring and high-speed network sales climb**



* Remainder of 1987 percentage attributable to low-speed networks

SOURCE: KESSLER MARKETING INTELLIGENCE
CW CHART: TOM MONAHAN

YES! I Want to Integrate my Applications

- Please send me more information on TPX
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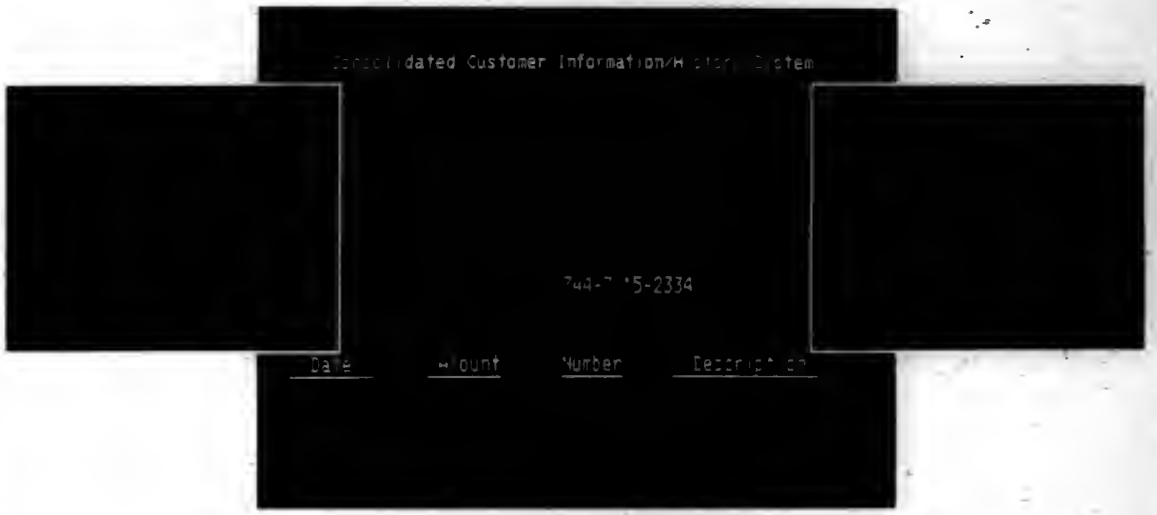

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Two Allegheny Center
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Cincom

CONTINUED FROM PAGE 55

"Now, MIS can electronically distribute the new software to users, as long as the corporation has the license to operate that software."

As an example, Masson said, a new version of Lotus Development Corp.'s 1-2-3 spreadsheet could be distributed this way. However, he noted, no formal arrangements have been made with specific software vendors to endorse this method of distribution.

Corporate users must pay a separate fee for each user's copy of the Navigator product, Cincom said. User fees will vary from $150 to $275, although volume discounts are available for large orders. The Navigator software for PCs will be delivered on 5¼- and 3½-in. disks.

A separate mainframe fee ranging between $20,000 and $40,000 will buy Navigator for the host IBM machine, with prices varying according to CPU configuration.

Developed within over the last year, Navigator has four components: the Dispatcher, Autopilot, Copilot and Developer modules. "Dispatcher is really the engine that underlies the product," Masson explained. "It acts as a central switching station for data flowing from the mainframe." Dispatcher manages the data repository from which copies will be sent over the network.

The Autopilot facility allows users to get automatic upgrades of the software they use, even if that software arrives overnight. "Autopilot could start up 1-2-3 and run a Lotus macro to pull in data just delivered," Masson said. The Copilot module provides remote diagnostic capabilities. MIS programmers can use Copilot to troubleshoot software problems at remote sites from their data center. The software allows programmers to see the user's screen as it appears during the diagnostic tests, Cincom said.

Finally, the Developer module gives programmers a tool kit to create new applications based on software distribution.

Navigator is available immediately, with installation taking from one week to 10 days, Masson said. "PCs have come into the corporation in a variety of ways, and users have tended to go off and do their own thing," Masson said. "The complexity of the corporate computing environment is so great now that end users need to rely increasingly on MIS to support them, and this tool enables MIS to do that effectively."

No backup

CONTINUED FROM PAGE 55

missions must be acknowledged by the recipient terminal controller within a specific time, or the host assumes the transmission did not get there and breaks the connection.

With terrestrial cable connections such as TAT8, the receiving device gets the transmission and acknowledges it quickly enough to save the connection. But there is too much delay when each transmission — the original sending and the acknowledgment — involves a hop up to the satellite and then a return to earth.

"If you're using a broadband circuit on TAT8, and if there is a failure and you want to switch back to C- or Ku-band satellite transponders, the likelihood of doing that is slim because of the propagation issue," said Ken Phillips, chairman of the Committee of Corporate Telecommunications Users and vice-president of telecommunications policy at Citicorp.

Even the system's largest investors are hedging their bets. "We're not putting all our eggs in this basket just yet," said Richard Wallerstein, a spokesman at AT&T International, Inc., which owns 34% of TAT8's bandwidth.

Bankamerica Corp. officials share AT&T's opinion. When the bank begins using TAT8 later this year, it will use the fiber cable initially only for voice communications while continuing to use satellites for its primary data transmission method. "The TAT8 line is the backup for the satellite," Vice-President John Macri said at the recent American Bankers Association 1989 Bank Telecommunications Conference in New Orleans. "If the satellite goes down, we throw away the voice on TAT8 and use that for data."

Still, some users have supreme confidence in TAT8. "Our contingency plans are pretty loose," said Shelly Candidus, a spokesman at Bull H. N. Information Systems, Inc. "We have two circuits [running on TAT8], so if one fails, we go to another. If there were any repeat problems, I think we'd consider the satellite option."

While Candidus noted that the engineering information Bull runs across TAT8 is "extremely important, it is not critical to the functioning of the company. But we feel very confident that the line won't go down." Only weeks ago, however, one segment of the line did fail. TAT8 separates at an ocean-bed branching point 300 miles west of Europe, with one portion heading for the UK and another making a beeline for France's Brittany coast. On Feb. 6, the French leg of TAT8 went down and transmissions were routed through the UK.

Nine days later, the entire 3,969-mile-long cable was powered down for repair and transmissions were sent via satellite. By Feb. 19, the cable was fully operational again. The episode resulted in a lot of finger-wagging from competitors. "We restore a lot of cable traffic, and cable never restores satellite traffic," a Communications Satellite Corp. spokesman said. "And there are no sharks in outer space."

LAN Manager

FROM PAGE 55

room for improvement, which will be addressed in LAN Manager 1.1, slated for a midyear release, according to Alan Kessler, marketing director of 3Com's Software Products Division.

Last month, both during the Networld '89 Boston trade show and its annual software seminar, Microsoft Corp. laid out its vision of enterprisewide networking for the next three years and discussed possible extensions to LAN Manager.

Today's corporate environment, according to Rob Glaser, director of marketing at Microsoft's Network Business Unit, still consists of personal computer islands using local-area networks and databases for limited file and print sharing, while the bulk of the mission-critical data remains on mainframe "continents."

Further separating users from this data are weak PC-to-mainframe links, he said.

Glaser predicted that three years from now, mission-critical data will move to LAN servers, mainframe data will be accessed via gateway servers, and all this data will be manipulated with PC-based tools.

Given that scenario, Microsoft aims to provide a standard connection from PCs to servers while also providing mainframe connectivity. Glaser outlined some potential connectivity-related enhancements to OS/2 and LAN Manager:

- More tightly coded drivers.
- Improved performance/scalability, including support for Intel Corp. 80386 coprocessors, specialized I/O subsystems, hundreds of workstations per server and fault tolerance.
- Distributed file directory services, providing location independence for users, making large networks easier to administer and supporting network facilities such as electronic mail.
- Mail services, including back-end store-and-forward capabilities within the LAN and CCITT X.400-compatibility for wide-area public service links.
- Security, including support for encrypted sessions and authentication and validation services as well as the ability to achieve B2 government-security rating.
- A 32-bit data path to and from disk storage devices for software running on 386 servers.

Microsoft and 3Com are co-developing network adapter drivers that reportedly will take up significantly less memory, a hot topic among LAN users in general these days.

The LAN Manager drivers will be compressed from their current expanse of 80K to 100K bytes of random-access memory down to roughly 30K bytes of RAM and will ship in mid-April.

Working on it

Kessler said that 3Com has been working on the DOS memory problem and plans shortly to provide a retroactive upgrade at little or no cost.

Microsoft is also working on its previously announced three-phased transport protocol strategy: Open Systems Interconnect Transport Class 4 (TP4), IBM-compatible Netbeui and Transmission Control Protocol/Internet Protocol (TCP/IP). Transport protocols act as a bridge between applications software and network hardware.

First announced a year ago, Excelan, Inc. is providing TCP/IP, which will be provided to OEMs via the LAN Manager developer kit, said an Excelan spokesman. This stack, running under DOS and OS/2, will provide standard TCP/IP to Netbios mapping.

Microsoft's ISO OSI TP4 stack will be provided by 3Com from code supplied by Retix Corp. Kessler did not provide a shipping date.

SNA tool speeds data transfer

BY PATRICIA KEEFE
CW STAFF

LAGUNA HILLS, Calif. — SNA software that supplants a micro-based gateway by supporting multiprotocol local-area network-to-host connectivity was unveiled recently by Network Software Associates, Inc. (NSA).

The AdaptSNA 802.2 series is a family of IBM Systems Network Architecture (SNA) communications software for IBM Personal Computers and compatibles and Personal System/2s attached to a Token-Ring.

The software reportedly lets PCs talk directly to an IBM host via multiple SNA protocols, thereby eliminating the need for a gateway PC and decreasing data-transfer times.

The latest addition to NSA's Adapt product family was designed to work with Token-Rings directly connected to mainframes or host controllers. For example, the software can be used on a Token-Ring linked directly to a 3174 cluster controller via IBM's Token-Ring Interface card. This facilitates data transfer at Token-Ring speeds of 4M- to 16M bit/sec. By comparison, NSA said the fastest PC gateway product is limited to speeds of 56K bit/sec.

Moreover, NSA said its approach allows SNA to recognize each PC as a separate physical unit. This means that each PC can be directly addressed using SNA facilities such as IBM's Netview, which cannot address logical units. When using a gateway PC, only the gateway is recognized as an SNA physical unit, while other PCs are viewed as logical units, NSA said.

NSA claimed its AdaptSNA is the first to allow PCs to communicate with the host via any of the following SNA protocols: interactive 3270, batch RJE (3770/RJE), LU6.2/Advanced Program-to-Program Communications (APPC) or LU0. IBM offers 3270 and LU6.2 APPC via direct connect; an NSA spokesman said the firm was the first to offer remote job entry and LU0 in addition to 3270 and LU6.2.

The series consists of five modules priced from $245 to $785. An optional LAN Gateway, which allows PCs to be either physical units or logical units, starts at $995.

DEC details OSI-based networking strategy

BY ELISABETH HORWITT
CW STAFF

LITTLETON, Mass. — Digital Equipment Corp. laid out a few more pieces of its OSI-based multivendor networking strategy last week and attempted to clarify how the industry communications standard will fit in with Decnet, its existing proprietary system.

DEC Director of Enterprise-wide Networking Lee Sudan reiterated the company's commitment to painless Open Systems Interconnect (OSI) migration for Decnet users but also indicated that the company has no immediate plans to discard Decnet's higher level functionality in favor of the industry standard.

DEC's three formal networking announcements were the following:

• X25Portal 2000, communications server software that allows CCITT X.25 devices to communicate over a backbone of Decnet — and later OSI — routers [CW, March 6]. The package, which runs on any DEC VAX, Microvax or Vaxstation, is priced at $16,500 and ia available now.

• Enhancements to DEC's existing FTAM software to ensure that it conforms to the Government OSI Profile (GOSIP).

• DEC Wide-Area Network Controller 220, a VAXBI version of DEC's existing DVS11 controller, which is said to provide two 64K bit/sec. synchronous connections between DEC systems and X.25, Decnet and IBM networks. Priced at $8,450, the 220 is available immediately.

DEC spokesmen also attempted to clarify where the firm stands in terms of OSI migration. The company now offers a full range of OSI networking software, including FTAM and CCITT X.400 applications, that allows users of the existing Decnet Phase IV system to communicate with other OSI-compliant systems, Sudan said.

Decnet Phase V, which ia scheduled to be available around the middle of next year, will come out of the box with a full set of OSI protocols but will also incorporate the upper three layers of Decnet. These layers, unlike the lower ones, are still different from OSI, Sudan said.

Decnet V's built-in OSI networking will provide a transparent solution to users' multivendor connectivity needs, he indicated. For the last 15 to 18 months, DEC has undergone OSI interoperability testing with a broad range of other vendors, primarily on OSInet, an OSI testing facility sponsored by the National Institute of Standards and Technology, Sudan said.

DEC recently "retired" its proprietary DDCMP protocol in favor of High-Level Data Link Control, thereby providing fully OSI-compliant wide-area networking, Sudan said. But he would not comment on when — or even whether — DEC intends to migrate the higher level functions of Decnet to OSI as it has with the lower four networking layers.

The firm is weighing the possibility of superseding its proprietary file transfer protocol, DAP, with OSI's FTAM, he said.

Still, Sudan insisted, having a dual set of upper-level protocols in Decnet Phase V is necessary because it allows users to communicate both with DEC's existing installation of more than 300,000 Decnet devices and with OSI devices.

Fritz

FROM PAGE 55

on the back of the set. In this way, desk sets become the interface between ISDN and the office computer. It's kind of like having a very fast modem built right into the phone.

• Terminal adapters. They function somewhat like modems and even look a little like them, but since ISDN is all digital, the terminal adapter has nothing to MOdulate or DEModulate.

Most terminal adapters offer one or more RS-232 ports so that several computers can be served from one terminal adapter and one ISDN Basic Rate Interface (BRI) line. Multiple data ports are of value in multitasking operating systems such as Microsoft's OS/2 or Apple's Multifinder. The personal computer can send a report to a remote printer over one ISDN channel while simultaneously transferring a file via the second channel.

• Coprocessor cards. In a sense, these are like internal PC modems. ISDN coprocessor cards can be very powerful and may have very sophisticated integrated software, so comparing them with internal modems is a bit of a misnomer.

Coprocessor cards have the ability to support high-speed file transfers between PCs. Since they work off the personal computer's bus, the transfers can be done synchronously at 64K bit/sec.

At such high bit/sec. rates, synchronous transfers tend to be more efficient than asynchronous ones. Thus, coprocessor cards usually have a throughput advantage over desk sets or terminal adapters that must rely on the asynchronous serial ports of the PC.

An ISDN Basic Rate Interface comes to your office with three channels on one telephone line. There are two B (bearer) channels, B1 and B2. Both have the ability to carry synchronous or asynchronous data at 64K bit/sec. The data can be transmitted as circuit-switched (dialed much like a regular telephone call), packet-switched (as in local-area networks such as Ethernet) or "nailed up" (on-line with the central office all of the time).

The third channel, the D channel, supports packet data at 9.6K bit/sec. ISDN'a D channel is as fast as most of today's fastest modems. Its B channel runs faster than most common telecommunications data networks.

Commonly, the B1 channel is used for voice communications, but in data-intensive environments, it may be advantageous to carry data on both B channels. But beware — not all ISDN CPE offers full access to the ISDN network. Some will allow access to only one data channel at a time. This may be your choice of B or D but not both simultaneously. There are other limitations as well: Some ISDN devices limit transmission rates to 19.2K bit/sec. on the B channel or do not support synchronous data.

In some computer environments, one data channel at 19.2K bit/sec. may be enough. If you are not hampered by this limitation and see no need for better capability in the future, then you may elect to go with more limited equipment. But keep in mind that it is not hard to outgrow such limited devices, and the cost differential for the extra sophistication is not great in many cases.

The other item to consider in the selection of ISDN devices is B-channel rate adaption. ISDN's B channel always runs at 64K bit/sec., no matter what. When a user wants to use the B channel at a slower rate — for instance, 19.2K bit/sec. — ISDN equipment uses rate adaption to slow things down. The rub is that manufacturers use different methods for B channel rate adaption. Since both ends need to rate-adapt in exactly the same way, only compatible equipment can be used on both ends. This usually means sticking with one manufacturer's brand.

The bright side

The good news is that there is some movement to adopt a single standard. Currently, V.120 looks like a good candidate. However, until there is a single standard adopted by all ISDN equipment manufacturers, some care must be exercised to ensure B-channel compatibility.

There is little doubt that ISDN will become the data telecommunications service of the future. While it will not take over the services offered by high-speed networks such as Ethernet and Token-Ring, it offers convenience and flexibility unheard of in other data services.

It is the wise manager who considers today whether ISDN is right for his business computer system.

Fritz is a data communications analyst at West Virginia University in Morgantown, W. Va.

BIT BLAST

Cincinnati Bell snares $88M deal with NTT

Cincinnati Bell Information Systems (CBIS) has signed an $88 million agreement — its largest ever — to complete management systems and technical services for **Nippon Telegraph and Telephone Corp.** (NTT). CBIS will build nine systems, which will operate on a series of interconnected mainframes, during the next two years to automate NTT's Japan telephone business operations.

Source Telecomputing Corp. and **Official Airline Guides** have signed up with **Data America Corp.'s** recently announced Data America Information Service Exchange. The service reportedly provides access to different information services providers via the Vienna, Va., carrier's packet-switched and digital network services. Data America also unwrapped Digital Network Service Express, which reportedly will provide end-to-end management capabilities to customers of its fractional T1 service.

Filenet Corp. has announced a joint marketing agreement with Canada's **International Datacasting Corp.** to allow image and data transmission between Filenet systems via satellite communications.

Lachmann Associates, Inc., a developer of Unix software, inked a pact to distribute Open Systems Interconnect software from **Retix Corp.** that supports AT&T's Unix Streams interface and includes CCITT's X.400 message handling, File Transfer Protocol and management protocols.

Seven software developers have signed up to develop applications compatible with **Novell, Inc.'s** recently unveiled Portable Netware network software. These include **Oracle Corp., Relational Technology, Inc., Wordperfect Corp., Informix Software, Inc., Unify Corp., Access Technology, Inc.** and **Uniplex Integration Systems, Inc.**

Also, four database companies said they will interface their products to **Novell's** Netware SQL and the Btrieve integrated data management software. The firms are **Gupta Technologies, Inc., Revelation Technologies, Inc., Alpha Systems, Inc.** and **Concentric Data Systems, Inc.**

The **Wollongong Group, Inc.** announced it will customize and distribute its WIN/TCP for 386 Streams product for **Intel Corp.'s** supermicro Multibus II Unix system.

Acer Counterpoint has signed licensing agreements with **Brightwork Development Corp.** and **FTP Software, Inc.** Acer will license Brightwork's PS-Print printer-sharing program and FTP's PC/TCP.

Brightwork, meanwhile, inked OEM pacts with **Wang Laboratories, Inc.** and **Mannesmann Tally Corp.** Wang will license a modified version of Brightwork's Netmanager network management product, which it will market, sell and support for use with Wang's PC LAN. Mannesmann Tally will resell a customized version of PS-Publish, desktop publishing printing software, that will allow its Universal Publishing system to be shared over Novell networks.

NEW PRODUCTS

Network management

Hewlett-Packard Co. has announced enhancements to the HP 4945A wide-area network (WAN) protocol analyzer.

The upgrades are HP 49541 access and analysis software for Integrated Services Digital Network (ISDN), the HP 18320A language environment for C programming and the HP 18321A package for CCITT X.25 Levels 2 and 3 emulation.

The HP 49451 WAN protocol analyzer for ISDN is priced at $20,500, and the HP 18320A software costs $2,000. The emulation package is scheduled for delivery in July, and pricing will not exceed $2,000, the company said.

HP
3000 Hanover St.
Palo Alto, Calif. 94304
800-752-0900

Apollo Computer, Inc. has unveiled a network computing-based backup system designed to reduce the complexity of systems administration across distributed networks.

Called Omniback, the product can perform file system backup operations across a heterogeneous computer network, the vendor said. It is reportedly built on Apollo's Network Computing System and is currently being offered on Apollo workstations.

Omniback must be purchased in two components: the base product, which is priced at $5,000, and the machine licenses, which are priced at $150. Volume discounts are available, according to Apollo.

Apollo
330 Billerica Road
Chelmsford, Mass. 01824
508-256-6600

Electronic data interchange

GE Information Services, a division of General Electric Co., has announced software enhancements to its EDI Express System.

Reportedly used by more than 3,500 trading partners, the product electronically transmits invoices, purchase orders, freight bills and other documents in a variety of public and private formats and protocols. Version 7.0 of the system is said to include reports and selection criteria for Status Reports. It also provides News Feature Access for users.

In addition, the company has announced Version 5.0 of the EDI PC System, its EDI software for microcomputers. The package reportedly enables trading partners to prepare and exchange business data electronically in standardized document formats and can be used as either a stand-alone workstation or as a front end to an in-house computer. The latest release includes a revised document processor with menu capabilities and pop-up windows.

The initial program license fee for the system workstation software for the EDI Express System is $1,450 per copy.

GE Information Services
401 N. Washington St.
Rockville, Md. 20850
800-334-5669

Links

Encore Computer Corp. has announced its Multimax 500 family of symmetrical multiprocessing systems for commercial and technical applications.

According to the vendor, the Unix-based machines provide as much as 170 million instructions per second (MIPS) of computing power and up to 67.2G bytes of storage capacity. The Multimax can be used as a high-performance file server for distributed computing environments and can be configured to support more than 1,000 users, the company said.

The systems are expandable in 17-MIPS increments at a reported price/performance level of less than $3,500 per one MIPS. Pricing starts at $159,000.

Encore
257 Cedar Hill St.
Marlboro, Mass. 01752
508-460-0500

A software utility that gives IBM Personal Computers and compatibles direct access to printers connected to Digital Equipment Corp. VAX/VMS systems is available from Owen/Davis Systems.

PC Print Version 3.0 now works with DEC's LAT terminal servers over Ethernet as well as through conventional distribution panels via a twisted-pair cable, the vendor said. The software reportedly reduces cabling requirements and is priced at $895 per VAX CPU. For a limited time, the company is offering the latest release at the previous $495 price.

Owen/Davis Systems
1335 S. Acacia
Fullerton, Calif. 92631
714-956-9159

Attachmate Corp. has introduced a personal computer-based automation software program designed to access data residing on mainframe computers.

Called Now PC/Host Autoware, the product uses IBM 3270 emulation software for data transfer between the personal computer and the host. Commands and steps are automated so the PC user does not have to learn the mainframe's procedures to retrieve information, according to the company.

The product is available in two versions. The Author's Version reportedly includes all software and documentation necessary for creating autoware programs and is priced at $565. The User's Version, capable only of running autoware programs, has a price tag of $195.

Attachmate
13231 S.E. 36th St.
Bellevue, Wash. 98006
800-426-6283

MANAGER'S JOURNAL

EXECUTIVE TRACK

Eugene M. Klawikowski has been promoted to the position of director, corporate information systems at **Great Northern Nekoosa Corp.** in Norwalk, Conn.

Klawikowski had been manager, management information and systems at Great Northern Nekoosa's Nekoosa Papers, Inc. division in Port Edwards, Wis., since 1976. In his new position, he replaces Richard W. Fickey, who was named assistant vice-president of administration at Nekoosa Papers.

Klawikowski, 45, joined Nekoosa Papers in 1967, where he held several positions of increasing responsibility until his 1976 promotion. He holds a bachelor's degree in mathematics and a master's degree in business administration, both from the University of Wisconsin.

William J. Hazelwood was named to replace Klawikowski with the new title of manager, management information and services at **Nekoosa Papers.** Hazelwood has been manager of computer information systems at Great Northern Nekoosa's Leaf River Forest Products division since 1982. He was previously with another Great Northern Nekoosa company, Great Northern Paper, as systems projects leader. Hazelwood holds a bachelor's degree in business administration from Upper Iowa University.

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any job changes in Executive Track. When you have news about any staff changes, be sure to drop a note or have your public relations department write to Clinton Wilder, Senior Editor-Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

Worldly leadership at Dow Chemical

Huppertz combines Dutch eye for detail with laid-back management style

BY WILLIAM BRANDEL
CW STAFF

Overseeing the information systems of a $13.4 billion, multinational chemical company forces one to think big — globally, in fact.

It takes a manager who can see the big picture from an international perspective combined with an eye for the most minute of details. For Hans Huppertz, corporate IS director at Dow Chemical Co., that means making IS a big part of the various business functions.

Huppertz's ability to explain the details to the most computer-illiterate managers at Dow makes him the right man for the job, says his boss, Dow Chief Financial Officer Joe Downey.

"Hans can promote that enthusiasm for technology and IS and discuss it in terms that business can understand," Downey says.

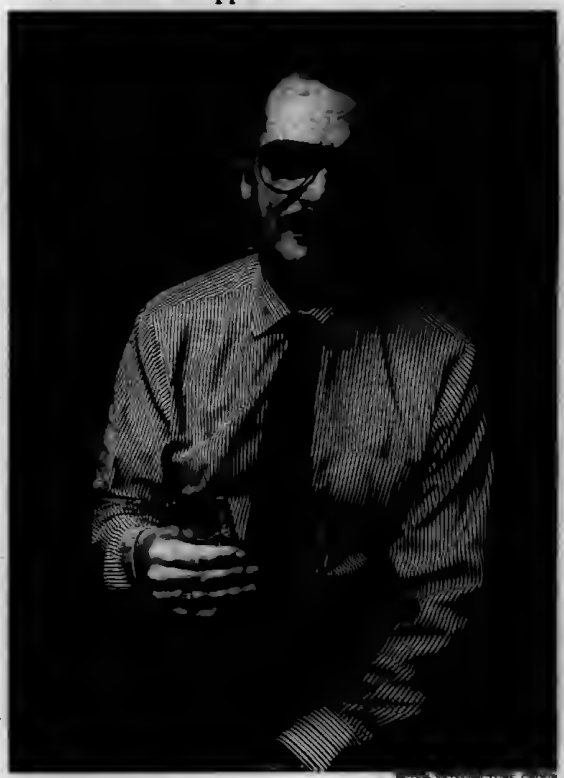
Huppertz, who was born in the Netherlands, says it is his mix of Dutch ethnicity, a business and technology education and time spent in California that has given him the style of a laid-back, hands-off manager that can understand the details while integrating business and IS functions.

"I think we Dutch are very meticulous in terms of what we do," Huppertz says. "The Netherlands is a small country with a lot of people. If you're not very organized, it gets very chaotic. I bring this perspective to management."

Late last year, Huppertz was moved from presiding over Dow's U.S. IS division to concentrate on corporate information systems, which oversees the U.S. and Dow's major international

Continued on page 74

PROFILE: Hans Huppertz



PETER YATES/PICTURE GROUP

Position: *Corporate information systems director, Dow Chemical Co.*
Mission: *Implementing a five-year global information systems strategy to link Dow users and customers worldwide*

CIOs still have to run the executive gauntlet

BY ALAN J. RYAN
CW STAFF

Information executives are the rookies on the executive team at most companies and have to prove their worth before they will be completely accepted.

So said William Atkins, national director of advanced technology practice at Touche Ross & Co., at the recent Financial Executives Institute conference in New York. Atkins said that information systems executives were considered minor-leaguers before the mid-1980s. As systems grew into strategic weapons, so grew respect for IS executives, he said.

The IS executive still has a long way to go, though. Traditional corporate functions such as accounting and marketing have long histories and an educational heritage, while IS has a very short history, Atkins said. Often, IS originated under the wing of another department before being turned out on its own. Until as recently as five years ago, there was very little educational training available for IS jobs.

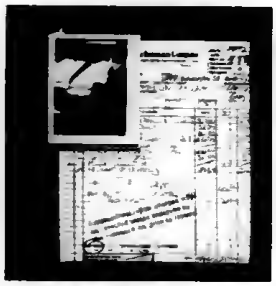
Some IS advice from Atkins: Stop "speaking in tongues" with technical acronyms. Instead, IS officials should speak in basic business terms that other executives can understand. Also, be honest about what can and cannot be done using systems. "Don't say you'll deliver a Cadillac and then deliver a Chevy," Atkins advised.

TERRY ALLEN

Also important, Atkins said, is that IS understand the company's products, markets, customers and competitors to be certain systems they design will help the business strategically.

Further, before automatically alienating themselves from other executives, the information executive and the company's chief executive officer should work together to come up with an appropriate title. "Don't be a CIO if everyone else is a senior vice-president of something," Atkins said.

A Better Image Can Do Wonders For Customer Service. And That's No Idle Claim.



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INTEGRATED IMAGING

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Education

FROM PAGE 1

eyebrow-raising. Higher education in the U.S., particularly in quantitative disciplines such as science, business and mathematics, has taken on an increasingly international flavor. The class of 1990 at MIT's Sloan School of Management, for example, is populated by 37% foreign students. Eager, promising students from India, Japan, South Korea, Taiwan, China, Singapore and other Pacific Rim nations flock to the U.S. to fill university seats.

According to the Institute of International Education in New York, there were a record-high 356,200 foreign students in the U.S. in 1987-88. Of that, 21% studied engineering, 19% business and management and 10% math and computer science.

"The percentage of foreign MBA students majoring in MIS is higher than other disciplines because there is such a strong need in other countries for MIS professionals," says Jeffrey Hoffer, coordinator of the MIS program at Indiana University's School of Business.

"I started seeing the trend over the last eight years, and it's continued to build," says Jay Nunamaker, head of the MIS department at the University of Arizona.

But the growing number of foreign students in MIS programs raises a number of red flags for both academia and industry. "Obviously, in some respects, we are helping the competition," Nunamaker says.

"Foreign competition is already strong," adds H. Russell Johnston, director of Boston University's MIS program. "So if they get well-trained MIS people, there will be a dramatic catch-up in an area where they are currently weak. But we have to ask, do we want a promising student from Japan or a mediocre one from New Jersey?"

Though not unique to MIS education, the questions being raised are critical to administrators of MIS programs around the country:

- Are foreign students taking valuable seats in classrooms in a critical discipline from American students?
- Are Americans exporting knowledge in yet another crucial area — IS — back to potential competitors in the global economic wars?
- With an acknowledged shortage of qualified faculty for MIS programs getting worse, is the U.S. facing an unbalanced number of foreign faculty teaching MIS in U.S. universities?
- Are foreign graduates taking top jobs in multinational companies that might otherwise have gone to Americans?
- Have American students begun to forsake MIS as a career path, thus leaving "a hell of an opportunity for foreign students," as one American educator put it?

Though aware of these concerns, most educators conclude that there is little cause for alarm. Academic tradition dictates an open campus, they say, and foreign students should be viewed as an asset to a program.

"We believe that we should just take advantage of the rich international environment we have here and maximize it," says Stuart Madnick, head of the Information Technologies Program at MIT's Sloan School. "It's clear that internationalization is critical in business today, and if you want to expose U.S. students to an international view, this is the best way to do it. We can't afford to fly them to other countries."

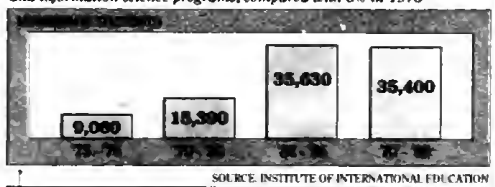
Not everyone echoes Madnick's perspective, however. There is a nagging feeling that foreign students are reaping benefits that American students seem to be ignoring.

"U.S. students are not valuing the mix of technical and business training we are providing and how it can be parlayed into a solid career," Johnston says. "They are looking for more glamorous professions such as investment banking. The foreign students, though, are seeing a terrific opportunity in this field."

The students themselves echo the feeling that studying in the U.S. provides a major opportunity. "To my knowledge, the U.S. is the best place to get an information systems education," states a Korean Ph.D. candidate

Melting pot

About 10% of all foreign students are currently in math and computer and information science programs, compared with 5% in 1975



SOURCE: INSTITUTE OF INTERNATIONAL EDUCATION

The international flavor

MIS programs are experiencing an influx of foreign students at postgraduate levels

Percent of degree candidates who are foreign students[1]		
School	*Master's level*	*Doctoral level*
Boston University	30%	70%
University of Arizona	33%	20%
Georgia State University	25%	30%
UCLA	N/A	57%
USC	20%	25%
University of Texas at Austin	22%	60%
Indiana University	25%	30%
University of Minnesota	15%	50%
University of Pittsburgh	20%	60%
MIT	15% to 30%[2]	56%

[1] Some schools do not have specific MIS majors or degrees but have MIS concentrations
[2] MBA candidates at MIT can have dual concentrations, so it is difficult to determine the exact percentage viewed as MIS majors

CW CHART: FRANK C. O'CONNELL

Pradeep Kumar (standing), Gary Winer and Sandib Patel (front) are candidates for a master's in MIS

Kumar came 11,000 miles from Malaysia to attend BU

PHOTOS ON PAGE 1 AND 66 BY MARTHA EVERSON

'Should I stay or should I go?'

For many foreign students, the "stay in America or go home after graduation" question is often answered by forces beyond their control. Many foreign students are subsidized by their government and have agreed to return upon graduation. Also, immigration issues create a barrier that many U.S. companies are unwilling to hurdle.

Communications issues can also create an obstacle to permanent residence. For this reason, more Indian students, for example, choose to stay, while more Korean students tend to return to their homeland.

"Indian students tend to have excellent English skills and have little trouble settling in this culture," says Sudha Ram, a native of India who received her Ph.D. from the University of Illinois and is now an assistant professor of MIS at the University of Arizona. "We find the U.S. is more open to other cultures."

Conversely, Pradeep Kumar, a master's student in MIS at Boston University, sees vast opportunity in MIS back home. "My main goal is to get into a multinational corporation for a couple of years and then go back home to Malaysia or to Singapore or the Philippines," he says. "At home, MIS is relatively new, and I can start in a new business and have a lot of impact."

According to Gordon Davis, Honeywell professor of MIS at the University of Minnesota, the rate of return to native lands varies by global region, especially on the doctoral level. Davis helped found Minnesota's MIS Research Center 20 years ago and has tracked the trends of doctoral students through the years. He says, for example, that most Indian Ph.D. candidates stay in the U.S., while 60% of Koreans and Taiwanese return home.

The return rates among other nationalities, according to Davis, are as follows:

- **Singapore.** Since most have received government subsidies to study in the U.S., 90% return.
- **Mainland China.** Though there is a recent surge in Chinese applicants, it is too soon to have numbers on rate of return for this potentially huge group of students.
- **South America.** There are few doctoral students in MIS, but of those, 60% return to their countries.
- **Europe.** Most will return home.
- **Japan.** The country is not a big player in information systems education; most Japanese students prefer computer science.
- **Australia.** Eighty percent return home.
- **Northern Africa (Egypt, Tunisia).** Most will return home.

Davis points out that the immigration issue is a growing obstacle for foreign students, but if they focus on a discipline in which a demand can be demonstrated in the U.S., immigration status is easier to obtain. "Faculty in MIS are in demand, so many of the bright foreign students choose that field," Davis says. "That way, they can stay. But it is getting harder."

At the master's level, the stay-or-return ratio is tougher to track, Davis says, but he adds that far fewer at that level stay in the U.S. "There's more opportunities for MBA students to hook up with multinational corporations, stay here for a while and then get sent back home," he says.

GLENN RIFKIN

at UCLA who declined to be identified.

"This is the place to be to stay in touch," says Sudha Ram, a native of India and an assistant professor of MIS at the University of Arizona. "Even though MIS is developing in India, it is still far behind."

"You cannot get any advanced courses such as mainframe systems classes back home," Kumar adds, explaining why he came to the U.S. to study MIS. "Also, there is much more interaction with computers and projects here. At home, you get a lot of theory, and you might touch a computer once every three or four months. Here, you have 24-hour access."

Among the concerns for industry is what these graduates do once they have their degrees.

"The foreign students bring in lots of ideas from the international point of view, but the concern is that people come here and take the technology back and leave little behind," says Jim Senn, head of the MIS program at Georgia State University. "If they stay in touch, send colleagues . . . that'a a good relationship. If they don't, it does us little good."

Senn, echoing reaction from most of those contacted, claims the U.S. is far enough ahead in IS that there is little reason to worry about letting loose a golden goose to foreign competitors.

Not that far ahead

Paul Gray, chairman of programs in information sciences at Claremont Graduate School in Claremont, Calif., disagrees. He discounts the notion that the U.S. is that far ahead in information systems.

"In the information systems business, we don't have a monopoly. Vendors markets are global, and they train MIS people up to American standards no matter where they are," Gray says.

At Claremont, the MIS student population is almost exclusively American. "Very few students from abroad can afford to come to us without financial backing, and we are not going to subsidize them," Gray says. "We're a scarce resource, and foreign students are generally underfunded. I'm not going to find the funding for them."

Few schools have actually imposed quotas on foreign students. Such quotas tread on extremely sensitive ground. According to Lewis Leeburg, director of the information systems research program at the Anderson Graduate School of Business at UCLA, the influx of international students — particularly Asians from the Pacific Rim — has caused controversy within the University of California system.

"I'm not so worried about exporting talent as I am about the question of whether we are allocating seats in our schools fairly," Leeburg says.

For example, Japanese students flock to the UCLA campus. With an overall application-to-acceptance ratio of 11-to-1, the admissions issue "is a tough problem at UCLA."

At the doctoral level, the stakes are slightly different. Opportunities for teaching and research in MIS abound and are largely being ignored by American students. Lured by lucrative careers in industry, students are leaving the academic opportunities to foreign classmates.

"I'm more concerned about the trend at the Ph.D. level," says James Wetherbe, head of the MIS Research Center at the University of Minnesota. "If we can't maintain a good supply of faculty in MIS, we could have a big problem."

Eleanor Jordan, associate chairman of the department of management and information sciences at the University of Texas, adds, "In this part of the country, there are so many good jobs in MIS that American students forsake careers in academia. The foreign students see a real opportunity there."

Educators don't foresee dramatic changes in this academic importation. Jordan echoes most academics when she points out that the U.S. actually benefits far more than it suffers. "The international students make the classroom more competitive, and that results in better information systems people," she says. "The big losers are the countries that are donating some of their best people to us."

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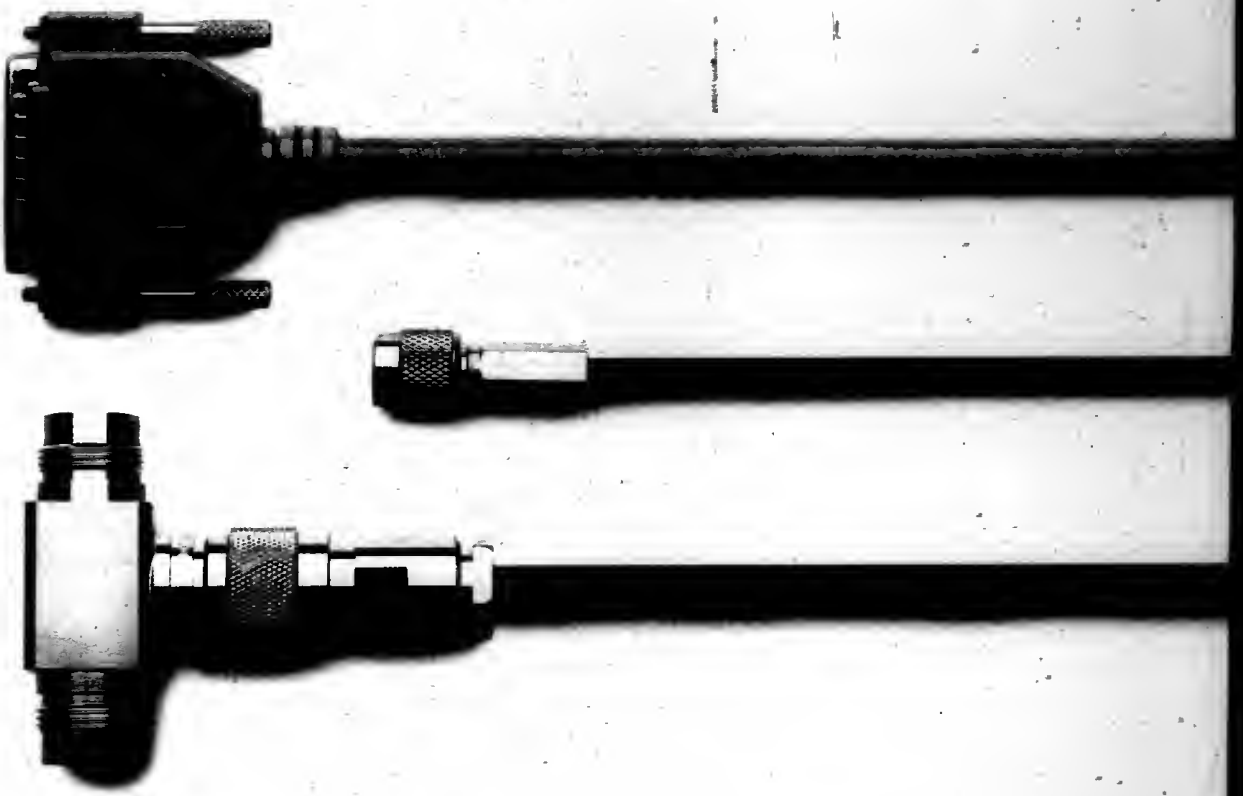

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TAKING CHARGE

Les Gilliam

The new EDP auditors

In the early days of computing, EDP auditors were few and not well-equipped for the task. Most were accountants with little or no experience in data processing.

But times are changing with regard to external auditors and their ability to carry out the responsibilities of the EDP auditor. Most large companies and many medium-size companies have established permanent internal EDP auditor positions and staffed them with knowledgeable professionals who come with valuable suggestions for improving the IS function.

One area that is always high on the auditor's list is the existence and enforcement of rules by which the IS organization carries out its responsibilities. It is surprising, even after all these years, that some IS departments continue to operate by the seat of their pants without the use of a set of standards.

What to look for

The auditors will do well if they look for the following as important elements in the IS standards. First, does the IS organization have a long-range plan that coincides with and supports the long-range plans of the company? Has there been an attempt to develop a business plan and identify strategic computer applications?

Next, does the IS organization routinely develop annual work plans? These should reflect the continuing implementation of the long-range plans, be fully supported by user departments and be approved by senior management.

Auditors should be interested in how budgets are prepared and controlled. To what level of detail is the budget broken down, and do IS managers receive accurate and timely reports that allow them to exercise proper control over expenditures?

One area in which auditors are criticizing IS organizations these days is the lack of a well-defined methodology for application systems development. A good methodology will describe the principal tasks to be performed by all levels of the IS organization, including management, supervisors and project participants, to plan, manage and control systems development efforts.

If IS management is to plan and control expenditures and personnel activity properly, a resource accounting system is a necessity. The system should, of course, account for the use of the computer system by user department and application.

Time should also be logged so that management can monitor project time and costs as well as find opportunities to improve staff productivity.

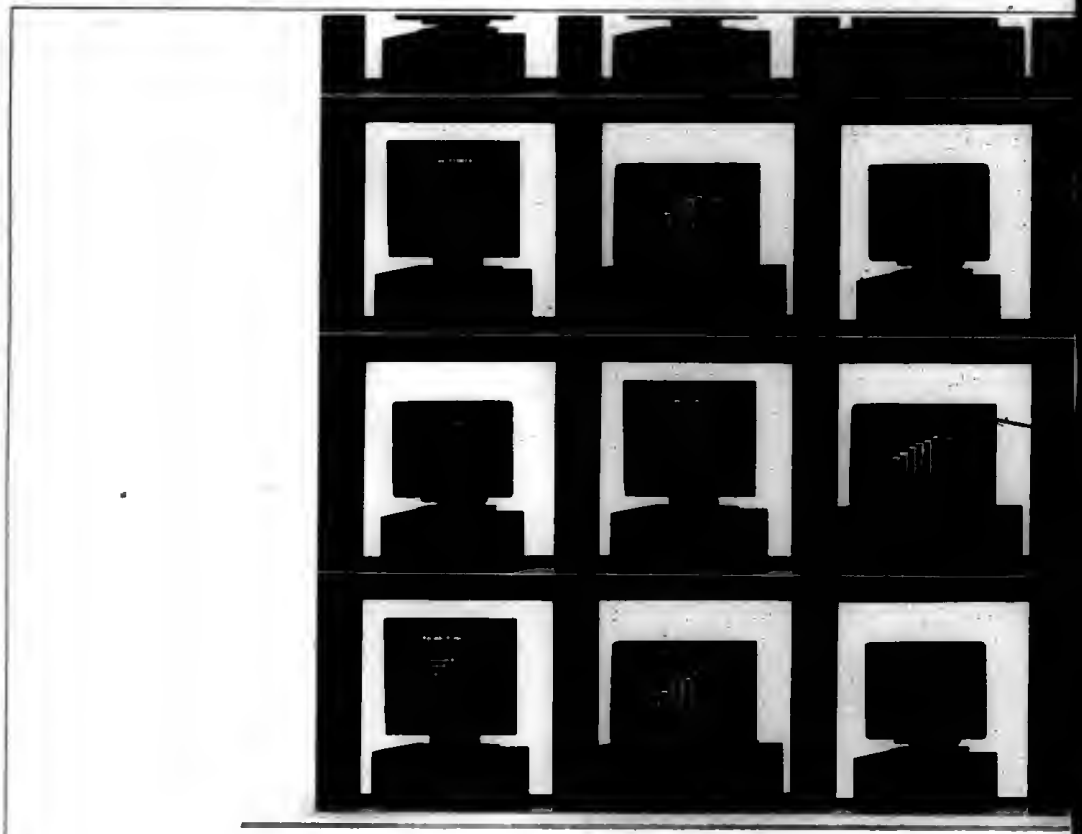
If the user departments are to be accountable for applications developed and processed on their behalf, then there must be a chargeback system in place.

Most companies say their greatest asset is their people. In most cases, however, people are also the most costly asset. Auditors should have an interest in how well this asset is being managed in the IS department.

A standard employee appraisal and counseling system can be used to gauge employee performance as well as to identify the outstanding employees, weed out the unacceptable performers and structure personnel development plans tailored to individuals.

If senior management is reluctant to approve the time and costs to develop a good set of standards, a well-prepared auditor's report will often provide the necessary impetus to obtain approval.

Gilliam is president of Gilliam Associates, a computer management consulting firm based in Ponca City, Okla.



Turning out the lights in operations

BY J. A. SAVAGE and JOANNE KELLEHER
CW STAFF

SAN DIEGO — Like backwards moths, operations managers at the recent annual conference of the Association for Computer Operations Management were drawn toward "lights-out" advice.

"Lights out," or unattended operations, is something that has drawn the keen interest of many managers in the late 1980s, but few have made the incremental changes necessary for their shops to run truly unattended. When they have, it is only for a few hours at a time.

In shops that support some unattended operations, Arnold Farber, president of Farber/LaChance, Inc., a consulting firm in Richmond, Va., said that most now operate without human help for two to five hours. The longest period of lights out that he cited was eight hours, which was achieved at an auto company and a Colorado service bureau, both unnamed. Farber said the service bureau is working toward a 12-hour dark shift. Starting with a small time segment makes it easier to notice and address problems without them getting out of hand, Farber said.

AFCOM

It is not necessary to buy snazzy new hardware or software to move toward unattended operations, according to Farber. He said much can be done with currently underutilized equipment.

Farber suggested automating functions such as balancing work loads, environmental monitoring and the Help desk. Environmental monitoring, for instance, would run software from a company like Johnson Controls, Inc. to make sure the proper cooling is maintained in the computer room, rendering on-site building maintenance unnecessary.

Other hot issues in operations management at the conference were those that deal with human management and those that deal with nonhuman, or robotic, management.

> IT IS NOT necessary to buy snazzy new hardware or software to move toward unattended operations.

Managers are facing people problems in several areas. The longest-running issue is job displacement through automation. Cross-training is one way to address both that issue and the newer problem of the lack of turf security.

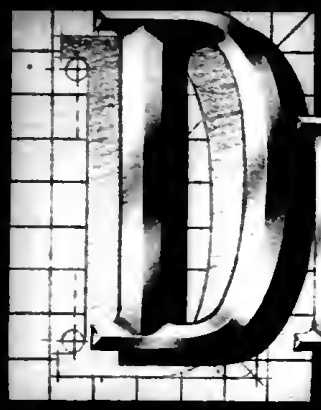
For instance, in downsizing operations or bringing in application-specific equipment, you need to quell the dedication to MVS and cross-train to other environments, said Richard Sitts, an automation specialist who is implementing 3M Co.'s five-year automation plan.

In the nonhuman area, robotics in tape storage garnered some interest. Tape library robotics, about 1 year old, allows much faster finding and mounting of cartridges. It has been apparently well received as a way to manage otherwise unwieldy amounts of data.

As a way of protecting their operations and formulating realistic goals, operations managers are increasingly turning to service-level agreements — a contract that lets both provider and user of services know what to expect, when and how much.

"They help to respond to an ever-changing environment," said Fred Luevano Jr., manager of computer operations at Northrop Corp.'s Aircraft Services Division. "It helps you know where the bottlenecks are."

However, service-level contracts may not be as widespread as they could be because while they pinpoint the level of responsibility, they likely expose the person with that responsibility.



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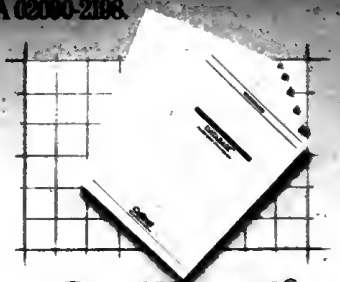

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Dow

FROM PAGE 63

IS divisions. Having previously reported to the vice-president of engineering, Huppertz now reports directly to Downey.

Huppertz is now entrusted with the company's most ambitious IS project ever — global information systems. The strategy will not only put a majority of Dow's worldwide users on the same network but will also give Dow's customers around the globe access to product and sales information as well. The five-year project is now in its second year.

In nine years as IS chief, Huppertz has succeeded in raising Dow's IS group into a prominent role in Dow's business picture. With 1,600 individuals employed to support more than 50,000 users, that picture is big. But under Huppertz's tenure, IS has one less link to travel to access the highest chain of command. Huppertz says he likes to think of himself as the glue between those working in the business functions and those managing them.

Along with Downey and the IS staff, Huppertz formed a representative unit that places an IS professional in each of Dow's business entities. Making up a group called the Business Systems Manager Council, IS staffers are now active in the separate chemicals or plastics development business decisions and functions.

"I look at them as my account managers out there," Huppertz says. "They look at what these businesses are doing and make sure that the right tools are in place, and then the IS function as a whole supports these people. They can say, 'These are some of the important applications we have to work on in the next couple of years.' "

Huppertz has also established a computer resources board, which essentially prompts high-level managers of the different functions and businesses within Dow to become directly involved with IS decision making.

"This was a pretty shrewd move on Hans' part," Downey says. The connection of IS to any business decision "is now a given. And with a multinational like Dow, you have to have a reliable IS to make the company work."

Studied economics

A recipient of a bachelor's degree in economics, Huppertz began his professional career in business for Netherlands-based companies and then moved to California in 1960 to live with an uncle. After enrolling at the University of California at Berkeley in 1962, Huppertz was turned on to data processing by a friend who had taken a class, which Huppertz then attended.

Huppertz moved back to the Netherlands in 1968 and accepted a job at Dow's Netherlands facility, working his way into the IS management hierarchy. He was called to work in Dow's Midland, Mich., headquarters as top IS executive in 1980.

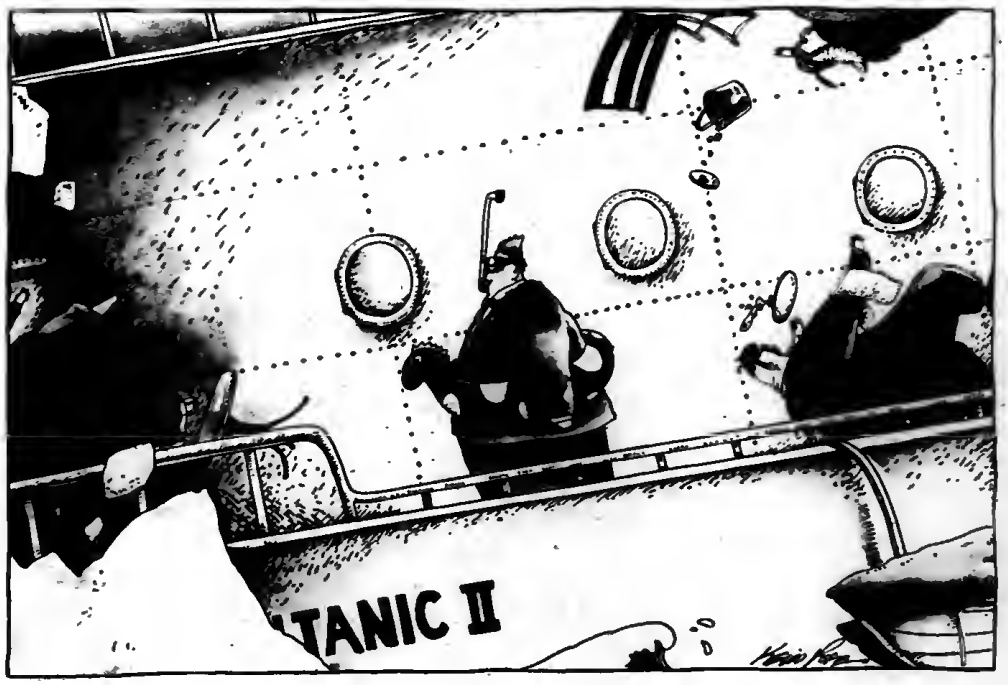
While Huppertz prefers to hire MBAs and then teach them technology, he says he tends to hire creative people who will bring fresh ideas into his division.

"They have to interpret the business needs and the competitive advantage achieved by a computing system," Huppertz says. "We look for the creative innovators. Sometimes they're a little harder to manage, but they bring so much to the party in terms of ideas. We give them a certain amount of freedom, they understand what we expect of them, and they have a minimum of supervision."

As a result of his recruiting, Huppertz has a staff that tends to get ahead of him in regard to technology projects — and he encourages it. For example, Huppertz decided that Dow should look into expert systems, only to find that some people both inside and outside of his staff were already experimenting with them.

"Because of their backgrounds, our users usually have the exposure to technologies like AI before we do," Huppertz says. "So we asked, 'Hey, what are you doing? Let's share resources and capital.' We brought them together and got the synergism going. That's really the role we play, to bring it together and then help."

DISASTER PREVENTION AND RECOVERY



KEVIN FOPE

Survivors know the value of preparedness

BY SUZANNE WEIXEL

Until it happens to you, says Charyl Sarber, you cannot really know what disaster means. "You can plan and you can practice, but until you have experienced a disaster firsthand, you cannot understand."

One of the least understood characteristics of disaster, Sarber says, is that it seldom takes the shape you would have expected. Certainly no one at First Interstate Bank of California, where Sarber is vice-president and manager of business resumption planning, could have foreseen the fire that gutted five floors of First Interstate's 62-story headquarters in downtown Los Angeles on the night of May 4, 1988.

By the time the flames were extinguished, the company's securities-trading room, which normally handles from $3 billion to $5 billion per day, was totally destroyed. Mini and microcomputer equipment housed in the bank's bond-trading division had all but melted in temperatures reaching up to 2,000 degrees Fahrenheit, and approximately 2,000 employees had to be relocated.

In fact, the bank was able to salvage its operations from the ashes of the fire, giving customers a semblance of business as usual the next morning and restoring functions to all key bank units within 24 hours. But the reasons for rapid recovery had nothing to do with anticipating the specific form that the disaster would take. Instead, First Interstate was rescued because, unlike many companies, it had decided long before anything ever happened that disaster preparedness was a critical and continuing need.

First Interstate started developing its business resumption plan in 1986. Development took place in weekly and biweekly meetings between 47 critical operating units, 31 supporting critical applications and an in-house professional planning staff.

"Because we had set up a very good infrastructure, the plan held together [during the fire], but we learned that although you can plan for recovery, you cannot plan for a specific

Weixel is a free-lance writer based in Framingham, Mass.

INSIDE

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disaster," Sarber says. "Flexibility is very important."

Sarber calls the bank's disaster recovery plan a "living document." Never completely finished and placed on a shelf, it has always been reviewed and tested at regularly scheduled intervals. Many crisis scenarios are detailed as part of the plan, as are the appropriate responses to each situation.

Subtle changes

As a result of the fire, subtle changes have been made in some of the plan's specific details, and some switches occurred in the recovery order.

For instance, First Interstate decided to reexamine what it calls its tiers of criticality: The first tier identifies what needs to be recovered in 24 hours, and the second tier points out what needs to be recovered in 72 hours.

First Interstate's Sarber

The fire also showed First Interstate how important it is to keep its plan current and well maintained. Prior to the fire, First Interstate was in the process of loading plan data into Chi/Cor Information Management, Inc.'s Total Recovery Planning System disaster recovery software.

"Since the fire, we are more convinced than ever that an on-line relational database is necessary in keeping the plan up-to-date," Sarber says.

Sarber adds that a person's ability to cope under extreme circumstances makes or breaks the recovery operation. "If we ever had to go through it again, I think the most important thing we gained was confidence," she says. "We now understand crises management in a way we couldn't before."

Arthur Cybul, data processing operations manager at A. M. Castle & Co., a metals distributor based in Franklin Park, Ill., agrees with this attitude. "The first time through you think, 'Oh my God, can we do this?' The second time you think, 'We can do anything!' "

Cybul should know. In August 1987, torrential rains left 20 inches of water throughout Castle's corporate facility, forcing the organization to evacuate the building. In May 1988, the infamous fire at Illinois Bell's Hinsdale switching office caused the company to declare an emergency for the second time in nine months.

"The effects of the fire on business were potentially far more serious than the effects of the flood," Cybul asserts. "But because we had been through the flood and had made certain changes, we had confidence in our plan."

Before the fire and flood hit, Castle had run regular tests of its three-year disaster recovery plan to make sure it would work. Sanford Sherizen, an information security and contingency planning consultant and president of Data Security Systems, Inc. in Natick, Mass., says a full-blown disaster simulation is the best way to truly discover if a plan will pull the company through a disaster.

But even with the tests, Cybul says he had some surprises when the real thing hit. "When you are testing, you have all sorts of luxuries, including the luxury of time and the luxury of choosing who stays on-site and who goes off-site," he adds. "There's no top executive looking over your shoulder asking when the system will be up. The actual disaster is a whole different ball game. The pressure is tremendous."

First Interstate *after the fire*

Cybul discovered many details that never came into play during testing. For instance, how will employees staffing off-site facilities be compensated? Castle, a long-time subscriber to Comdisco Data Recovery Services, Inc., learned that all the money spent on disaster recovery over the years paid off in more ways than just having a hot site to go to. Comdisco also took care of logistics, including travel plans for the recovery team and transportation for backup tapes.

In addition, Cybul found out that nothing can be taken for granted. During the test scenarios, he had always assumed that if relocation was necessary, the Franklin Park headquarters would have been destroyed.

Because no one expected to have a fully intact facility standing in 20 inches of water, no communications provisions had ever been made to link Castle's corporate office to the hot site. Castle has 27 offices located nationwide, but because the Franklin Park site was underwater, none of them had on-line capability.

After the flood, company officials addressed this gap by adding more equipment, including dial backup lines. In May, when the Hinsdale fire wiped out one-third of the company's data network, the dial backup lines were put to good use.

Unfortunately, as Cybul learned in spite of the company's faithful test runs, it often takes an actual disaster to point out the faults of a recovery plan. Before the Hinsdale fire, Motorola, Inc. thought it understood its telecommunications routing. "Now we know better," sighs Toni Waeghe, market manager of industry marketing at Codex Corp., a wholly owned subsidiary of Motorola.

When the switching office burned, Motorola was left without 35 domestic data circuits, four international data circuits, incoming 800 service, international toll-calling ability and incoming-call service.

Despite the use of multiple vendors, all of the lines in Motorola's network went through the Hinsdale hub. "We thought we had everything covered," Waeghe says. "For instance, we had dial backup facilities in place, using phone lines and modems. Lo and behold, those lines went through Hinsdale, too."

Motorola is currently completing a replacement for the private voice network for all its facilities. Network planners are scrutinizing every routing scheme, examining routing maps and working closely with vendors to be sure there are no more surprises. "We learned our lesson," Waeghe concludes.

Valuable lessons

The flooding disaster also taught Castle lessons about how important people are to the recovery process. After the disaster, the company realized its recovery plan's basic organizational structure needed reworking.

"It had been that you started with Step 1 and when you got to Step 100, you were finished," Cybul explains. "We learned that in order to make the system more readily available to the end user, efforts would have to be done simultaneously. This means that the people involved really have to understand what needs to be done."

Castle now likens the enactment of its disaster plan to the

ASK THE VENDOR

Does the Expert Auditor Disaster Recovery package have a function that will assist in auditing a data center's disaster recovery plan?

Bruce Morrison
EDP Audit Manager
Kemper Financial Services, Inc.
Chicago

MIS TRAINING INSTITUTE: The Expert Auditor series was designed to enable personnel without extensive technical training to conduct audits in highly technical areas.

Expert Auditor leads the user though the audit step by step. With its extensive contextual tutorials, the auditor learns the package as he audits. The system then analyzes the input and generates a complete audit report.

enactment of a play: There is a cast of characters and each character has a role. Who plays what role is less important than having the role performed.

Jon William Toigo, author of the book *Disaster Recovery Planning: Managing Risk & Catastrophe in Information Systems*, says that misuse of personnel is a fundamental problem with many disaster recovery plans. Too often, he says, the objective of the plan is to arrive at a set of procedures and write them down in a book.

A vital part of the planning stage is teaching people how to act in the event of an actual disaster. "Shakespeare said it best," Toigo says. " 'All things are ready if our minds be so.' "

First Interstate is a prime example of a company that takes such advice to heart. It claims that the relative ease with which it met the challenge of an actual disaster was due in large part to the involvement of critical units in making their own business resumption plans. "It was really the people who built the plan who made the plan work," Sarber says. "They knew what to do and they did it."

Another common weakness in recovery plans, according to Toigo, is that current methodologies still focus on mainframes, ignoring such industry developments as decentralization and telecommunications.

Sherizen says most companies have a tendency to plan for simplified internal disasters, overlooking what he calls "the spreading environment of risk."

> "ONE OF THE biggest things we learned from the flood was not to waste time declaring an emergency. In 1987, we put the business at risk by waiting. In 1988, we didn't hesitate."
>
> ARTHUR CYBUL
> A. M. CASTLE

In the case of the Hinsdale fire, companies had just assumed that whatever disaster struck, phones would be available. But if the telephone company burns, it takes your telephone service with it. And without telephone lines, a company cannot conduct business.

But, according to Steve W. Petty, director of the consulting services group at Computer Business Associates, Inc. in Tampa, Fla., the planning often stops there. Companies "fill three to five volumes with information and then put them on a shelf," he says, "It's out of date as soon as it's finished."

Even when there is an updated recovery plan in place, preconceptions about what constitutes a disaster can cause costly delays when it comes to accepting the fact that the company is in an emergency situation.

When an untraceable short circuit in its Data General Corp. MV 8000 mainframe left the Oregon Telco Credit Union without on-line processing for five days last year, forcing personnel to manually record all activity, the word "disaster" took on new meaning. Bob Kuhnert, the company's controller, says, "We always thought it meant a fire."

According to Kuhnert, Oregon Telco waited too long before contacting Data Assurance Corp., its Denver-based hot-site service.

"We never experienced an outage longer than one day," Kuhnert explains. "Data General service personnel found the short the first day, so they thought they'd be able to locate its origin."

As a general rule of thumb, Kuhnert says, Oregon Telco will now contact its hot site after one business day.

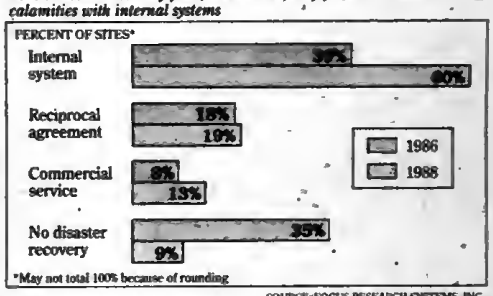
A. M. Castle also learned that the early bird catches the worm. During the flood, it waited an extra day to see if the water level would subside. As a result of this delay, Comdisco had already filled its local hot-site facilities with other companies affected by the same disaster. Instead of the hot site it had originally planned on, the Castle recovery team found itself far from home in a strange facility in New Jersey.

"One of the biggest things we learned from the flood was not to waste time declaring an emergency." Cybul says, "In 1987, we put the business at risk by waiting. In 1988, we didn't hesitate."

If hesitation in the implementation of a plan constitutes a risk, having no plan at all constitutes reckless endangerment. Right now, Sherizen says, too many companies are relaxing in the

Outfitted for survival

More than 90% of the 8,300 IBM and plug-compatible sites surveyed have a disaster recovery plan, and the majority prefer to counter calamities with internal systems



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NCR

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COMPUTER ASSOCIATES

Survivors

CONTINUED FROM PAGE 77

mistaken belief that a disaster will not happen to them. "It's not until the burglar hits the neighborhood that sales of alarms go up," he says.

Companies that postpone planning are betting against the odds, Toigo affirms. In his book, he says the chance of experiencing a disaster that affects a company's corporate data processing center are one in 100.

Toigo's book goes on to predict that the average company will lose 2% to 3% of its gross sales within eight days of a sustained computer outage. If the disruption lasts longer than 10 days, the average organization will never fully recover; 50% will be out of business within five years.

But even with those odds, it often takes a brush with disaster before companies start thinking ahead. "Nobody wants to think about a disaster, so [planning] gets put on the back burner," Petty says. "The irony is, if it's not dealt with from the start as an issue of MIS strategic planning, it's not going to get put in place until it's too late."

Codex' Waeghe

Those are words that Chris Seymour, an information services consultant for the treasury headquarters of AT&T in Murray Hill, N.J., can identify with all too well. The company did not place too much stock in disaster planning until an incident in December 1988 nearly destroyed some vital data.

The data center was in the process of implementing a local-area network, and some of the equipment — including a tape backup system — was not yet in place. Programmers were supposed to make daily backups of the applications being developed on floppy disks, but most of them did not.

"We were very busy trying to get the application systems oot the door," Seymour explains. "Using floppies was time-consuming."

Murphy's law

But, as Murphy's law would dictate, the hard disk drive on the LAN's file server broke down, taking a lot of vital data with it. Seymour, who was desperate to get the data restored, was willing to try almost anything.

"We actually took apart the computer to find out who manufactured the hard disk," Seymour says. The disk's original manufacturer directed the company to Ontrack Data Recovery, Inc., a subsidiary of Ontrack Computer Systems, Inc. Luckily for the utility, Ontrack was able to recover all of the data from the corrupted disk drive.

After this small catastrophe, Seymour took no chances. He made certain that each day's work was copied in two places — a hard disk on a personal computer attached to the LAN, in addition to the hard disk on the file server — until the tape backup system arrived. Once that system was up and working, the organization started making daily backups, which are sent to off-site storage on a weekly basis.

Short of experiencing a disaster, organizations intent on building a successful disaster prevention and recovery plan would do well to study the experiences of others.

> "TOO MANY firms are relaxing in the mistaken belief that a disaster will not happen to them. It's not until the burglar hits the neighborhood that sales of alarms go up."
>
> SANFORD SHERIZEN
> DATA SECURITY SYSTEMS

"Until you have experienced a loss, it is extremely difficult to perceive the tremendous amount of coordination and the actual damage recovery that must take place," says Pat Williams Moore, the national educational coordinator for BMS Catastrophe, Inc.

Moore says education is the best way to convince people that recovery prevention and planning are worth the effort. She spends most of her time traveling across the country lecturing to associations and other groups concerned with disaster planning, trying to get the message out.

"Unless companies have been made aware by experiencing a previous loss or through education, they tend to overlook [restoration of on-site facilities] in initial planning," she says.

Survivors try to learn from both their own experiences and those of others. First Interstate has pledged to continue testing, rehearsing and refining its plan, and Castle's Cybul does more reading about other people's experiences than ever before: "We are constantly learning. We know we can never be too prepared." •

Surveying the aftermath

BY STEVEN R. CHRISTENSEN AND LAWRENCE L. SCHKADE

Computer dependence, which is now a fact of life in most businesses, means vulnerability to functional and financial losses due to computer outages.

The extent of that vulnerability was the subject of a recently completed nationwide study conducted by The Center for Research on Information Systems at the University of Texas at Arlington (UTA).

The occurrence of a computer outage has four undesirable effects, the study found. First, there is a reduction, or possibly a complete loss, of the ability to perform basic business functions. A second impact is loss of revenue. Third, the cost of conducting business increases. The fourth effect involves intangibles that generally are not easily priced but still have an adverse effect on the business.

Fifty-five percent of the study's respondents said that manual methods would be one of their recovery methods. However, only a naive recovery planner would believe that all of a company's computer-supported functions can be performed manually. Not only is much of the data locked in the dead computer's system, but, in many cases, the skills needed to return to manual methods have long been lost.

For example, the U.S. Navy learned during the late 1970s that radar operators in their computer-based Combat Information Centers had great difficulty returning to manual grease-pencil-and-ruler methods of target tracking when a computer outage occurred. Their manual target tracking skills had atrophied. You can imagine that a typical bank would have even more trouble trying to manually balance deposits and withdrawals.

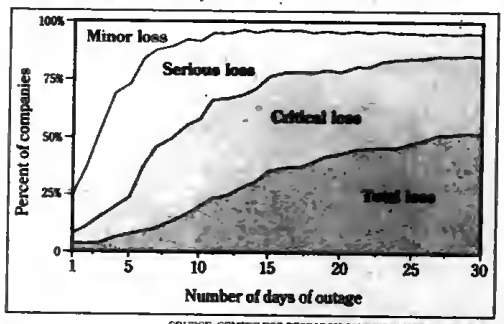
As the length of the outage increases, both the loss of functionality and integration of functions worsen.

Most businesses are able to function with only slightly reduced loss of efficiency for the first week. After that, however, approximately 50% of businesses predict total or critical loss of function.

Resorting to manual methods results in increased backlogs because only portions of the normal order volume, inventory tracking and shipment activities can be completed in this way. Even worse, however, are the effects of loss of integration in terms of information sharing. When coordination of information among departments is lost, errors can result, including promising to deliver goods that are not in inventory and losing sales because of erroneous out-of-stock reports.

A race against time

The longer a power outage persists, the harder it becomes for a company to perform its basic business functions



SOURCE: CENTER FOR RESEARCH ON INFORMATION SYSTEMS, THE UNIVERSITY OF TEXAS AT ARLINGTON
CW CHART: FRANK C. O'CONNELL

Computer outages can also have a big impact on an organization's revenue.

The order entry and sales functions have been so fully computerized that many organizations simply cannot process sales transactions without computer support. In the UTA survey, 51% of the respondents indicated that their sales and marketing function was totally or heavily dependent on computer support. Another 29% reported moderate dependency.

What is more, even if sales could be transacted manually, billing would be difficult at best. Eighty-nine percent of the survey respondents indicated their accounting function was totally or heavily dependent on computer support.

A less obvious, but nonetheless important, financial impact derives from the fact that computer outage initiates actions that cause the business to incur additional expenses.

The activation of a disaster recovery plan typically requires the use of alternative computer facilities — at some cost. Even if that is not the case and an organization depends solely on manual methods during the outage, there are other expenses. For example, manually producing paychecks requires typewriters, desks and typists — resources not usually available on a standby basis and even harder to find during a crisis situation. These reources must be obtained and their cost added to the price of doing business.

Disaster recovery consultants indicate

Christensen is a software design specialist at General Dynamics. Schkade is a professor at the University of Texas at Arlington.

most organizations underestimate their potential additional costs by as much as double what they anticipated.

Intangible costs constitute all losses in which there is no calculable amount associated with the loss. These include cash-flow interruption, customer loss, reduced competitive edge, legal and regulatory violations and erosion of industry image.

The largest intangible loss unveiled in the UTA survey was cash-flow interruption, which was cited by 85% of the respondents. Perhaps because there is no dollar amount associated with these losses, they are often not considered. However, they are the ones that continue to affect the business even after computer support has been restored.

The continued loss of customers, competitive edge and image may turn out to be more fatal than the temporary loss of revenue and additional costs.

The functional and financial impacts of computer outage can be severe and debilitating. Survival requires that organizations prepare for such an event.

Whenever a computer support system is proposed for a critical business function, the impact of a computer outage on that function should also be considered and appropriate provisions integrated into the system requirements. Periodic updates of the disaster recovery plan are required as the organization and its functions change. Last, but not least, if organizations are going to base their ability to weather an outage on reversion to manual methods, staff training in those methods is a must. ●

Most accidents happen when companies neglect the basics

BY SUZANNE WEIXEL

It isn't enough to plan for the worst: In order to be really safe, companies must also think about procedures to ward off preventable losses. In the rush to cover every recovery contingency, many firms forget some basic precautions.

Preventative measures run the gamut from installing uninterruptible power supplies and water detection devices to testing for environmental contamination such as smoke, dust and residue from laser printers. Security systems for hardware and software also fall under the prevention heading. But the prevention category that is both the most important and most ignored has to be data backup.

According to Jon William Toigo, author of *Disaster Recovery Planning: Managing Risk & Catastrophe in Information Systems*, 90% of disaster recovery involves restoring backup data. That high amount can be partially blamed on mainframe bias. Toigo says most plans ignore the fact that most users sit at workstations or personal computers, far from the company's mainframe.

Linda Uhl, a PC analyst at Continental Bank in Chicago, suggests another reason why PCs are often left out of central plans. Decentralization has produced a situation in which "each area sets its own rules for backing up," she says. "Obviously, some do better than others."

Companies that fail to enforce strong data backup procedures are looking for trouble, claims Ron Lachman, president of Lachman Associates, Inc., a systems development and consulting firm.

Only a few people develop good data maintenance habits from the start, he says. The rest barely read the user's manual. But if backup procedures are followed initially, a lot of headaches can be avoided.

Uh-oh!

Just ask Lori Dietrich, supervisor of planning and business analysis at Dorsey and Whitney, a law firm in Minneapolis. When the hard disk drive on her rented Compaq Computer Corp. personal computer crashed, she "thought it was the end of the world." Eventually, 99% of Dietrich's data was retrieved by Ontrack Data Recovery, Inc., a firm that specializes in rebuilding data off of damaged hard disks, but not before she had spent a frantic week trying to resurrect it herself.

"If the firm hadn't paid for the recovery service, I would have used money out of my own pocket," she says.

If the data was that important, why wasn't it backed up? Dietrich says she usually works on a Wang Laboratories, Inc. PC tied into the company's Wang VS 300 and backs up onto tape. In this case, however, her spreadsheets were too large for the Wang system to handle, so she rented a Compaq 38320 portable. Unfamiliar with the system, she was backing up the data directly onto the same hard disk. "Now, I always back up onto floppies, no matter how large the spreadsheet is," she says.

Jeffrey Dorfman, assistant vice-president of operations at Merrill Lynch Equity Management, realized the fruits of good backup behavior last October, when the vice-president of finance's Telex 1280 suffered a hard-disk failure. The disk had the company's entire budget on it, including a five-year projection.

Merrill Lynch's general backup policies call for immediate backup onto 60M-byte streaming tape using Sytron Corp.'s Sy-Tos software. The most recent backup in this case had been done the night before. Within three hours, the drive was replaced and the data restored, but a full day's work had to be redone.

The situation could have been much worse, he says. Until three years ago, when the firm suffered a major data loss, backups were done only once a month.

In addition to backing up data daily, Dorfman advocates total documentation to ensure a smooth restoration. Knowing exactly what data is located in each subdirectory and each file on a disk can save a company time and money. ●

Guard the line of retreat

BY SHARON BAKER

You can never be too prepared.

That's the lesson First Interstate Bank of California in Los Angeles learned 1½ years ago when an earthquake that rocked Southern California nearly caused one of its downtown branches to lose power.

Although the branch had a diesel-driven Emerson Electric Co. uninterruptible power supply (UPS), the earthquake fractured one of the fuel lines connecting the diesel tanks to the generators. Luckily, the branch had taken the precaution of installing a backup fuel line and was able to avoid a system shutdown.

But the thought that the backup line could also have been easily fractured was enough to scare bank officials into installing a third fuel line with different routing between the tanks and the generators, providing the bank with triple redundancy.

"You can't ever allow a single point of failure in your data processing environment," says Cole Emerson, vice-president and manager of information management at First Interstate. "If we hadn't had that backup fuel line, we would have gone down."

Companies install UPSs, complete with batteries and generators, as insurance against power failures. But what happens when a natural disaster threatens to dismantle that backup? What can be done to protect the protection?

Sanford Sherizen, president of Data Security Systems, Inc. in Natick, Mass., says he doubts that enough companies are asking themselves that kind of question. "You can be tripped up by the least-thought-out aspect of your specific [contingency] planning," he explains.

First Interstate, which has been brushed by disaster on at least two occasions, is more aware than most organizations of the need for multiple layers of protection. Last May, a major fire ripped through a branch seven blocks from the one hit by the 1987 earthquake. At this point, Emerson says he is prepared for almost anything, and he means that literally.

For example, a few years ago, Emerson identified the critical components within the banks' UPSs that were most likely to be damaged by a fire, electrical shortage or some other calamity. In addition to a list, that exercise yielded an alarming discovery: It would take almost six weeks to replace some of those parts.

The bank decided that it could not tolerate that kind of vulnerability and set up a backup stock of the most critical parts. Although he has never had to use this stockpile, Emerson says its existence provides a tremendous relief.

Such foresight would have been helpful to Carolina Chavez, manager of data processing at Banco Capitalizador in San Salvador, El Salvador, when that city was rocked by an earthquake in October 1986. Although the bank's Solidstate Controls, Inc. 15-kVA UPS system never failed during the quake, some of its batteries fell and broke, accounting for a reduction in power of approximately 25%.

Shortly after the quake, the bank relocated its entire operation. But because new UPS batteries had to be imported, the bank was forced to improvise its power protection for six months, using truck batteries to run the UPS.

After the new batteries arrived, Chavez says the bank purchased a sturdier rack to prevent them from falling if another earthquake hits.

Battery racks sold to companies in earthquake-prone regions are typically more structurally sound and can include side supports and straps that wrap around the entire rack to keep the batteries from falling. In addition, most companies bolt their racks and UPSs to the floor for further protection.

Placing rubber bumpers and pads between the diesel generators and the floor can also limit the amount of movement during an earthquake.

> "YOU CAN'T ever allow a single point of failure in your data processing environment."
>
> COLE EMERSON
> FIRST INTERSTATE BANK

Away from the heat

To protect UPSs from fires, companies can also install halon and sprinkler systems in the UPS room, as many already do in their data centers.

Robert Pozek, DP manager at the Arizona Automobile Association in Phoenix, says he purposely placed his 18-kVA RTE Deltec Corp. UPS in the company's main data center because the center already contained a halon system.

If a fire or flood does occur in the room containing the UPS, companies should notify the fire department that an electrical system is present or, preferably, turn the UPS off.

"You have to be careful in the event of a flood that the power is either turned off or that people are aware that the UPS is active," says Ed Maggio, manager of disaster recovery at Computer Data Communications Services Agency, a New York-based service bureau for 20 city agencies. "A lot of times, people run from an area [that has live power], and it's very dangerous for the fire department. Someone could be electrocuted."

Maggio suggests that companies train their employees to deactivate the UPS during a flood or fire. Simply turning off the building's power will only cause the UPS to kick in, so an additional emergency switch to kill the UPS power is necessary, he says.

To insulate a power system from fires raging in another part of the building, companies should keep their UPSs in rooms built with either concrete or two-hour-rated materials such as plasterboard. That rating, developed by the fire departments, means that it would take two hours for a fire to burn through the walls.

Companies, especially those located in flood-prone regions, should also try to keep their UPSs out of the basement.

All washed up

According to William Kramer, president of Kramer Data Power, Inc. in Bensenville, Ill., one of his Chicago-based clients had its UPS damaged by water during a heavy rainstorm two years ago. The system was located in the basement along with the sump pumps, which were not hooked up to the UPS. The pumps subsequently stopped working when the main power went out, causing the basement to flood.

If companies have no other place to put their UPSs, Kramer suggests they either install a redundant sump pump system or hook those pumps up to the UPS. At the very least, companies should avoid installing their UPSs underneath a main water pipe anywhere.

Regardless of what additional protective measures organizations take to keep their UPSs up and running during a natural disaster, consultants involved with contingency planning and disaster recovery agree that preventive maintenance of the UPS is the best way to ensure that the power supply does what it is supposed to do, when it is supposed to do it.

"If you're going to invest in having a UPS, it certainly makes sense to spend $5,000 for an annual inspection of your facility," says Kenneth Brill, president of Computersite Engineering, a Cambridge, Mass.-based engineering consulting firm that specializes in disaster avoidance and site reliability. "Disaster avoidance is not very sexy. But it is very cost-effective." •

Baker is a Computerworld assistant editor, features.

ASK THE VENDOR

Does AIM/SAFE 2000 provide a mechanism to allow users to develop a recovery plan?

John E. Smith
Disaster Recovery Analyst
Board of Public Utilities
Kansas City, Kansas

ADVANCED INFORMATION MANAGEMENT, INC.: One of AIM/SAFE 2000's features is its ability to create and maintain an unlimited number of user recovery plans.

The AIM/SAFE 2000 system provides three alternatives for user plan production.

First, programs on floppy disks can be created to allow users to make their own plans. All the necessary software programs, including word processing and a database management system, are on these disks. The users simply enter the data and customize the text of their plans.

Second, the disaster recovery manager may provide diskettes to users for their data input. These are then returned to the disaster recovery manager for text customization and production.

Third, the disaster recovery manager may choose to collect the data and produce the user plans himself.

Is Essential Software planning to eliminate Arise's support of SAS and/or the C List processor?

Carl Gage
Systems Manager
Litton Computer Services
Woodland Hills, Calif.

ESSENTIAL SOFTWARE, INC.: Arise 2.0, which is scheduled for release in July, will no longer use an SAS database structure or make use of the C List processor within the product. Arise has been redesigned to use Essential Software's database and terminal management software products.

No absolute protection, but virus filters do help

BY BELDEN MENKUS

A recently completed test of 21 antiviral software products offers significant encouragement to those concerned with fighting computer viruses. According to Harold Joseph Highland, director of the study, a number of the products tested can be used successfully in most instances to prevent the execution of programs already infected by known computer viruses and to detect significant changes already made to systems by these viruses.

Highland is editor of the journal, *Computers & Security*, and managing director of Compulit, Inc.'s Microcomputer Security Laboratory in Elmont, N.Y., one of the test sites for the project. The test was also conducted at Systems R&D, Inc. in Fort Lee, N.J.

However, none of the products tested provides perfect protection, claims Jon David, director of Systems R&D. Most of them operate off-line, checking periodically for the presence of a virus. To become more useful, David suggests, a product would need to check continuously — and transparently — for the presence of a virus.

Keeping pace

As viruses become more complex and powerful, antiviral products will, in turn, need to be designed to counter such sophistication, Highland says.

For example, future viruses will likely have the ability to reset internal program values instead of performing what Highland calls simple vandalism — trashing a program's file allocation table. The next generation of viruses is likely to attack file content directly. Highland says a primitive batch-file infector has already appeared.

As a result of the test project, improvements have been made in the design and performance of some of the products involved. David says developers of 15 of the products tested have used the study's results to improve their products. One problem unveiled was that most of the products were designed for use by those with a high degree of technical knowledge.

The study also revealed that several of the antiviral products tested prevented any attempt by a program file to write to the boot sector. "If such an attempt is made while the product is installed in the machine's hard disk," Highland says, "a message will be displayed indicating that the next keystroke will reboot the system. But if the system needs to be restored after some failure, such a product will make it impossible to do this."

Highland suggests installing a security override in the product to counteract this problem. Such a feature, which is now being added to some of those products tested, would permit an authorized individual to write to the system's boot sector during the restoration process.

The test covered 80% of the available products. Some of these are commercially developed programs, while others are various forms of public-domain software products. Two testing sites were used to permit independent verification of the product analyses. The investigation of each antiviral product followed a strict 11-point protocol, under which all 21 antiviral products were tested against two commonly circulating viruses. The antiviral products that failed to identify either of these two viruses were tested against a number of other viruses.

Highland says the report, which is scheduled to be released in May, will not recommend specific antiviral products but will be a forum for comparison. The document, titled "The *Computers & Security* Computer Virus Handbook," will also include several research papers discussing the practical defenses against viruses and the development of corporate policies to deal with those threats. ■

Menkus is a Hillsboro, Tenn.-based security consultant and editor of "Edpacs," a newsletter for electronic data processing auditors.

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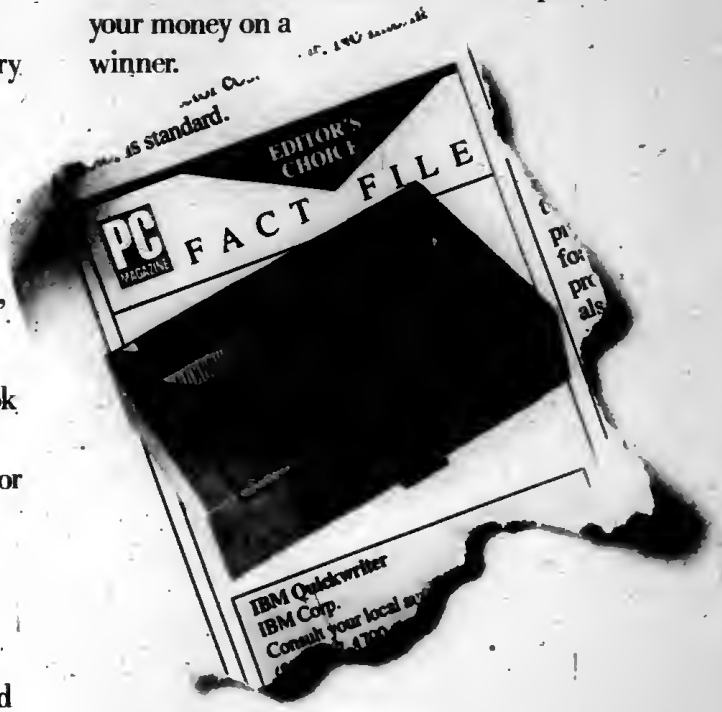

IBM

It pays to test all assumptions

BY ROBERT E. JOHNSTON

Without thorough testing of the recovery process, contingency planning is about as virile as a paper tiger. The plans may look capable, but chances are they won't be able to stand up to a real challenge. Companies find many excuses for failing to test their recovery schemes, but none of them hold up under scrutiny. The inescapable fact is that not testing the systems and procedures designed to guarantee delivery of reliable information to a business constitutes negligence.

Ironically, an often-cited reason for not conducting tests is that they are too disruptive and that they might interfere with the daily business operation.

Some companies, after installing the capacity to run on generator power, have never tried the backup system because they fear problems. The backup generators are maintained and tested independently, but they are never used in direct support of the computing environment.

Others conduct limited semiannual or less frequent tests. Frequently, such tests involve the evaluation of a commercial hot site. Usually, these tests are limited to a period of 24 to 48 hours during a weekend. Rarely are all critical applications capable of being thoroughly tested. All too often, the test is declared a success if the operating environment can be established with network communications.

But most major operations have three significant components — the applications, the communications network and the operating system — that need to be addressed in a disaster recovery plan. Some like to combine the latter two and refer to them as the operating environment. However, that approach is no longer realistic for contingency testing because individual network and operating system components must be evaluated separately if their collective value is to be accurately assessed.

Therefore, testing each of the three components via desk check and live local procedures makes a lot more sense than the annual test at the hot site.

Desk checks, conducted by the applications support staff and an analyst under the MIS director's direction, involve examining the crucial components of an organization's applications, discovering what critical inputs are dependent on other applications, what the important outputs are, whether those applications are properly backed up and what the user's needs are regarding recovery.

Desk checks are usually conducted whenever a company updates its computer system or does some other major revision that might effect its recoverability. The checks are typically conducted every two or three years and can take anywhere from two to four months to complete.

When properly conducted, a desk check test, which includes a standardized questionnaire that all participants answer, will reveal nearly all of a system's potential problems without the use of computing resources or in any manner jeopardizing the normal operating environment. The ingredient that makes the difference in such tests is an individual that understands applicatioo processing, the operating environment and contingency planning. It is not uncommon to have to conduct several desk checks on major applications before they are considered ready for a live local test.

Live local test

The live local test, which can be conducted during off-hours so as not to affect a business's daily operations, is a test of the recoverability at the normal processing site. In many cases, the most effective live local test of the operating system and network is following a routine recovery — such as a quick reboot — from a network and/or operating system failure. Every time a system faces a short downtime, the operations personnel should conduct a postrecovery analysis, introducing "what-if" scenarios to identify potential problems under more difficult conditions.

When the desk checks are thorough, applications will survive the live local test without any identified problems. This is possible because the desk check evaluates a small enough component to be able to detect all problems. Problems related to the operating system and network are more ofteo found in the live local test because of their complex integrated nature.

As the success rate of the desk checks are proven by the successful live locals, it will no longer be necessary to conduct a live local on each component. Reasonable sampling will continue to prove the continued effectiveness of the desk checks. As a result, the annual test becomes an accurate indicator of the probability of success or failure.

Undoubtedly, because of the perception that disaster recovery testing is counterproductive, few firms conduct such an ambitious testing scenario. The reality is that such a plan results in greatly improved daily operations, increased applications reliability and added user confidence. This occurs because testing becomes an ongoing, nondisruptive activity, rather than a periodic nemesis. •

Johnston is a regional director at a Glastonbury, Conn.-based company that specializes in contingency planning software and information security consulting.

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Risk and recovery planning software

COMPANY	PRODUCT	HARDWARE PLATFORM	SOFTWARE PLATFORM	REQUIRES EXTRA SOFTWARE	HANDLES RISK ASSESSMENT OR RECOVERY PLANNING	MAIN FUNCTIONS	COVERS DEPARTMENTS BEYOND DP	OTHER BUILT-IN APPLICATIONS	INTERFACES TO WHAT OTHER APPLICATIONS	EXPERT SYSTEM CAPABILITIES	MODELING OR SIMULATION CAPABILITIES	DISASTER TRACKING CAPABILITIES	NUMBER OF PREDEFINED REPORTS	TYPES OF CHARTS AND GRAPHS GENERATED	PRICE
Advanced Information Management, Inc. (703) 643-1002	AIM/Safe 2000	IBM PC XT, AT, PS/2 and compatibles	None	No	Recovery planning	Generates action-oriented recovery plans	Yes	DBMS, word processing	AIM/Safe, A Contingency Planning Methodology	No	No	No	42	NA	$2,995
American Technologies Corp. (703) 845-0067	Management and Recovery System	IBM PC, XT, AT and compatibles	Dbase II+	No	Recovery planning	Produces preplanning guides and assignments, detailed inventories databases, specific contingency responses, relocation guidelines and plans	Yes	Line editor, import program for word processing, import bit-mapped graphics, report generator	No	No	Yes	Yes	20+	None	$9,000
	AIM/Safe, A Contingency Planning Methodology	IBM PC XT, AT, PS/2 and compatibles	None	Super Project Plus	Both	Manages entire planning process, offers decision support and testing	Yes	Project management	AIM/Safe 2000	No	No	No	15	Gantt, PERT	$9,950
Business Recovery Systems, Inc. (800) 684-2483	Ultimate Survival Kit/USK-90	IBM PC XT, AT and compatibles	Advanced Revelation	No	Both	Assesses risk, plans development, manages events, generates reports	Yes	Project scheduling	Lotus 1-2-3, Dbase, all ASCII format files	No	No	Yes	70	User-defined	$1,495
Chi/Cor Information Management, Inc. (800) 448-8777	Total Recovery Planning System	IBM PC XT, AT and compatibles	Dataease RDBMS	No	Recovery planning	Generates multiple plans supports ongoing management of resources and procedures	Yes	DBMS, project management	1-2-3, Dbase, Wordperfect, all ASCII format files	Yes, query-by-example, multiple disaster scenarios	Yes	Yes	98	Organizational, action plan diagrams	$9,500 to $45,000
Candless Disaster Recovery Services, Inc. (312) 000-0000	Compas	IBM PC, AT and compatibles	NA	No	Both	Generates disaster recovery plan, teaches disaster recovery methodology, pre-forms documentation	Yes	Text editor, project management, DBMS	All ASCII format files	Yes, dialogue, hypertext	No	Yes	60+	Project management, Gantt	$21,000
Computer Performance, Inc. (203) 872-1972	Recovery/1	IBM PC XT, AT and compatibles	Dataease	Dataease	Recovery planning	Generates checklists, action plans, impact analysis, project management	Yes	Word processing, project management	1-2-3, word processing	No	Yes	Yes	100+	Organizational	$5,000
Data Assurance Corp. (800) 684-1000	DMC/Assurplan	IBM PC XT, AT and compatibles, Data General systems	Wordperfect	No	Recovery planning	Identifies outage levels, team responses by level, sub team organization, creates alternate facility plan	Yes	None	Unlimited	No	No	Yes	Unlimited	Team organization	$2,995
Disaster Recovery Services, Inc. (213) 432-0559	Disaster Recovery 2000	IBM PC XT, AT and compatibles	None	No	Both	Gathers data	No	None	ASCII format files	No	No	No	NP	Organizational, recovery teams	$5,495
EDP Security (800) 486-0000	Disaster Plan 90	IBM PC with 640K-byte and 10M-byte disks	MA	No	Recovery planning	Generates action plans, automated recovery flow, extensive query and reporting capabilities	Yes	RDBMS, word processing, spreadsheets, project management	Project management and desktop publishing	Yes, decision trees, automation of plan development	Yes	Yes	56	User-defined	$22,500
Executive Computertrics, Inc. (312) 687-1150	Corporate Recovery	IBM PC XT, AT, PS/2 and compatibles	Superproject Expert, Clipper, Co/Session	Word processing	Recovery planning	Organizes team-oriented DP procedures, manages full-functioned vital data and project management, creates audit trail	No	Word processing, DBMS	Spreadsheets, word processing	Yes, for testing, project coordination, recovery scheduling	Yes	Yes	50	PERT, Gantt, matrix	$9,000 to $18,000
Host Consulting Services, Inc. (203) 454-7810	Host-100	IBM PC with a 70M-byte disk	NA	Sideways	Both	Formulates checklist, scenarios, test procedures and department runs plans	Yes	RDBMS	All ASCII format files	No	No	No	25	Organizational	$9,000
Hotsite (919) 460-1234	Hotsite Recovery Plan	IBM PC XT, AT and compatibles	Any word processor	Word processing	Recovery planning	NP	Yes	Project management	Spreadsheets, graphics, DBMS	No	No	Yes	None	Action plan flowchart	$8,500
International Security Technology, Inc. (703) 471-0065	IST/Ramp	IBM-compatible mainframes	None	Ramp link	Risk assessment	Analyzes cost-benefit ratio	Yes	DBMS, project planning and tracking	None	Yes, what-if capabilities	Yes	Yes	20+	Chart from predefined reports	$16,500
	Crib-Calc	IBM PC XT, AT and compatibles	None	No	Risk assessment	Assesses criticality of applications to determine recovery costs	Yes	Threat occurance rates, annualized loss expectation	None	Yes, what-if capabilities	Yes	Yes	9	Chart from predefined reports	$1,950
Jerry FitzGerald & Associates (415) 591-5676	Rank-It	IBM PC XT, AT, PS/2 and compatibles	None	No	Risk assessment	Ranks risk of alternative options, most critical computer sites or applications, provides alternative scenarios	Yes	No	None	Yes, Delphi technique	Yes	No	2	Risk-ranking	$99.95
M-Plus Consulting Services (312) 286-7400	Recovery-Plus Computer Center Plan Development	IBM PC XT, AT and compatibles	PFS First Choice	No	Both	Evaluates application risk, alternative sites, off-site storage requirements; develops recovery team	No	Word processing, spreadsheet, graphics, communications	All ASCII format files	No	No	Yes	56	NA	$5,900 methodology, pricing per site
	Recovery-Plus Business Unit Plan Development	IBM PC XT, AT and compatibles	PFS First Choice	No	Both	Performs business function risk analysis, identifies equipment requirements, develops recovery teams	Yes	Word processing, spreadsheet, graphics, communications	All ASCII format files	No	No	Yes	37	NA	$1,000 methodology, pricing per site
	Basic Recovery Computer Center Plan Development	IBM PC XT, AT and compatibles	PFS First Choice	No	Both	Identifies hardware, software and off-site storage requirements, provides disaster prevention audit, develops recovery teams	No	Word processing, spreadsheet, graphics, communications	All ASCII format files	No	No	Yes	20	NA	$975 methodology, pricing per site

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.


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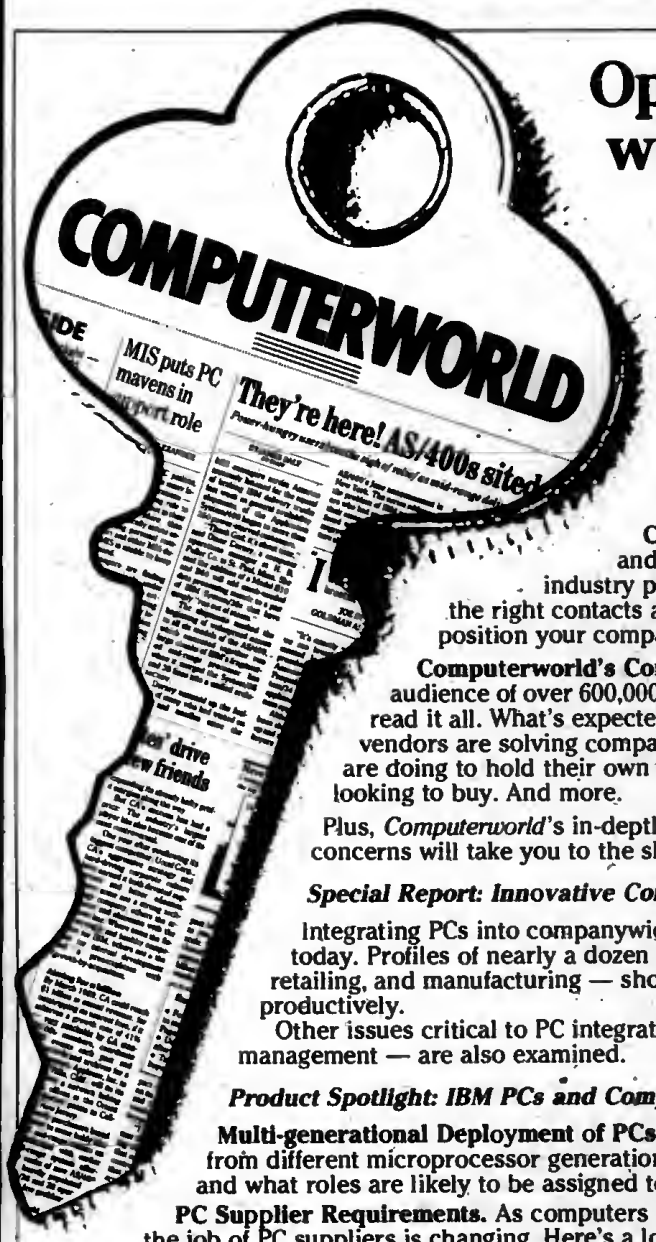
PRODUCT SPOTLIGHT

COMPANY	PRODUCT	HARDWARE PLATFORM	SOFTWARE PLATFORM	REQUIRES EXTRA SOFTWARE	HANDLES RISK ASSESSMENT OR RECOVERY PLANNING	MAIN FUNCTIONS	COVERS DEPARTMENTS BEYOND DP	OTHER BUILT-IN APPLICATIONS	INTERFACES TO WHAT OTHER APPLICATIONS	EXPERT SYSTEM CAPABILITIES	MODELING OR SIMULATION CAPABILITIES	DISASTER TRACKING CAPABILITIES	NUMBER OF PREDEFINED REPORTS	TYPES OF CHARTS AND GRAPHS GENERATED	PRICE
Mainframe Software Products Corp. (617) 239-0288	DRS	IBM PC XT, AT, PS/2 and compatibles	None	Word processing	Both	Analyzes and ranks risk, estimates monetary losses	Yes	No	Any word processor	No	Yes	No	50	Gantt	$4,900
Nader Brown & Co. (703) 689-4580	RA/Sys	IBM PC XT, AT, PS/2 and compatibles	None	No	Risk assessment	Maintains DBMS, assesses annual loss cost-benefit of safeguards	Yes	DBMS	Word processor, DBMS	No	Yes	No	3	None	$2,000
NCR Data Services (800) 782-7266	9.1.1 Disaster Recovery Planning System	IBM PC, XT, AT and compatibles	Informix Smartware	No	Both	Contains sample plan and disaster-tracking forms, accommodates multiple-level disaster plans and tests	Yes	Word processing, DBMS, spreadsheet, project management, communications, on-line support	Dbase III, 1-2-3	Yes, what-if capabilities, damage assessment, testing scenarios, extra expense worksheet	Yes	Yes	40	Organization, team, time/events, ad-hoc line, bar, pie	$8,000
Parnassus, Inc. (800) 225-8024	Cosco	IBM PC XT AT PS/2 and compatibles	NA	Wordperfect	Both	Generates full risk analysis plus values, risk report and graphs for all levels, full disaster recovery plan document	No	Project management	None	Yes	Yes	Yes	46	Risk-O-Gram index of threats, expectations of loss	$22,000
Profile Analysis Corp. (203) 431-8720	Recoverypac	IBM PC with 640K-byte memory	Paradox 2.0	None	Both	Provides disaster scenarios, data dependencies, dynamic updating, team tasking, allocates resources and costs	Yes	Project management, mainframe downloading	Lotus Symphony, 1-2-3, Dbase III, all ASCII format files	Yes	Yes	Yes	NP	NP	$9,600
	Recoverypac II	IBM PC with 640K-byte memory	Paradox 2.0	None	Both	Provides disaster scenarios, data dependencies, dynamic updating and team tasking, allocates resources and costs	Yes	Project management, mainframe downloading	1-2-3, Symphony, Dbase III, all ASCII format files	Yes	Yes	Yes	NP	NP	$1,450
	Riskpac	IBM PC with 640K-byte memory	None	None	Both	Assesses risk, physical security, telecommunications security requirements and vulnerability	Yes	Project management, mainframe downloading	1-2-3, Symphony, Dbase III, all ASCII format files	Yes	Yes	Yes	NP	NP	$4,000
	Federal Riskpac	IBM PC with 640K-byte memory	None	None	Both	Assesses ADP security compliance for goverment installations and criticality, analyzes vulnerability	Yes	Project management, mainframe downloading	1-2-3, Symphony, Dbase III, all ASCII format files	Yes	Yes	Yes	NP	NP	$13,500
Recovery Management, Inc. (508) 486-8866	Disaster Master	IBM PC XT, AT, PS/2 and compatibles	None	No	Both	Generates business contingency plans, addresses maintenance issues	Yes	DBMS, text processing, natural-language interface, on-line methodology	All ASCII format files	Yes	Yes	Yes	36	Bar, pie, area, hi-lo line and scatter plots	$12,500
David E. Scarbrough, Inc. (214) 867-1604	Fire-Alarm	IBM PC with 640K-byte and 10M-byte disks	Displaywrite IV, Symantec Timeline	No	Both	Develops action plan model and checklists, provides predefined forms for organizing, evaluating and presenting	Yes	Word processing, project management, DBMS	1-2-3, Dbase III, all ASCII format files	No	Yes	Yes	100	Status, task, PERT, Gantt, resource table, cash flow, actual vs. planned, other	$5,000
Strohl Systems (800) 634-2016	Multilevel Planning System	IBM PC XT, AT, PS/2 and compatibles	Dbase III+	Yes, Grandview, Microsoft Project	Recovery migration planning	Generates dynamic task list, project schedules, application recovery alternatives	Yes	Enhanced query/report facility, project control system, recovery-administrator	Single Site Planning System, DRP-EZ	Yes, what-if capabilities	Yes	Yes	125+	Resource histograms, network, analysis schedules, calendar activity	$22,175
	Single Site Planning System	IBM PC XT, AT, PS/2 and compatibles	Dbase III+	Yes, Grandview, Microsoft Project	Recovery migration planning	Generates dynamic task list, project schedules	Yes	Enhanced query/report facility, project control system, team control subsystem	Multilevel Planning System, DRP-EZ	Yes	Yes	Yes	100+	Resource histograms, network, analysis schedules, calendar activity	$18,075
	DRP-EZ	IBM PC XT, AT, PS/2 and compatibles	Dbase III+	Yes, Grandview, Microsoft Project	Recovery planning	Assists planning emergency, notification and recovery task list	Yes	Enhanced query/report facility, project control system, team control subsystem	Multilevel Planning System, Single Site Planning System	No	No	Yes	22	Resource histograms, network, analysis schedules, calendar activity	$7,450
System & Business Solutions, Inc. (215) 399-9000	Continue-The Disaster Recovery Solution	IBM PC XT, AT, PS/2 and compatibles	None	No	Both	Maintains disaster recovery plan with individual action plans	Yes	Multimate, Advantage II	NA	No	No	Yes	25	Project life cycle	$17,000
Target Marketing Group (314) 487-2734	DP AID-2001	IBM PC XT, AT and compatibles, systems from IBM, Wang, DEC, Bull H.N., Unisys, NCR	None	No	Both	Aids contingency planning, assesses risk	Yes	MS-DOS files supported, emulates VSAM-KSDS files, high-level text editor	Cobol, Pascal, C, assembler	Yes	Yes	Yes	40	Disaster flowcharts	$6,450 to $14,500
	DP-AID	IBM PC XT, AT and compatibles	None	No	Both	Aids contingency planning, assesses risk	Yes	Information management, word processing	All ASCII format files	No	No	Yes	20	None	$1,495
Technology Brokers International, Inc. (800) 456-8000	PC Continue	IBM PC, XT, AT, PS/2 and compatibles	NA	No	Both	Generates plan for PC disasters, provides for automatic backups	No	Menuing program with password protection, file manager module, automatic backup and restore	No	No	Yes	Yes	None	None	$500
Up Time Disaster Recovery, Inc. (916) 648-1282	Up Time Recovery Planning Tool	HP 3000	REX 3000, Powerhouse	No	Both	Assists formulation of team structures, generates checklists, scenarios, call resource lists	Yes	No	None	No	No	No	6	Cost lost applications, equipment lists, call lists, application information	$2,500



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Issue: April 10
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Product Spotlight: IBM PCs and Compatibles

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PC Supplier Requirements. As computers become more powerful and their uses more critical, the job of PC suppliers is changing. Here's a look at their requirements both today and tomorrow.

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IBM and IBM Compatible Comparison. A comprehensive chart shows how 80386-based IBM and compatible machines stack up.

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What ever happened to the PC revolution?

Today's plans focus on strategic end-user computing, not just hardware

JOHN KIRKLEY

It's hard to make a long-range plan when you're in the middle of a revolution.

Whether storming the barricades or firing the shot heard round the world, when the going gets tough, you're busy just surviving.

The personal computer revolution is no exception. It may lack the sweep and drama of other revolutions, but in the world of computing, its impact is no less momentous. Today's information systems managers are caught in the middle of this insurrection.

And despite the turmoil surrounding the rise of end-user computing, IS managers are finding it increasingly necessary to take the time to make long-range strategic plans that include the PC. Not surprisingly, their approaches vary.

Many IS managers do not have separate plans specifically devoted to personal computers; rather, PCs are considered as one more element in the strategic planning that reflects IS's commitment to achieving overall business goals.

In some organizations, personal computers are characterized as just another piece of equipment that any well-outfitted employee is expected to have in the workplace. According to Bruce Hasenyager, director of the corporate MIS division at Merrill Lynch & Co. in New York, "When you buy personal computers by the thousands, you tend to view them as a commodity — just another tool — not much more than a chair or a table."

However, Hasenyager adds, although an individual PC is almost in the same category as a telephone, deciding on the bus architecture is another matter entirely. Here, compatibility and connectivity issues have far-reaching corporatewide implications.

What PC revolution?

In reality, the so-called "PC revolution" does not exist. PCs are not, in themselves, the revolution. Rather, they have acted as a catalyst to fuel the real revolution within the corporate information systems world: the rise of end-user computing.

In the 1960s and '70s, when there were no alternatives, users endured inevitable applications logjams, two-year backlogs, and, in many instances, viewed the DP department as a kind of corporate black hole in which work went in but never came out. Yesterday's DP managers, who focused on their technical expertise to the detriment of their people skills, sometimes alienated users and set them to grumbling about their lot in life.

It is no wonder that when the personal computer appeared on the scene, particularly after IBM made it official, the users grasped the new machines to their bosom and, with cries of "Liberte, Egalite, Fraternite," headed for the barricades.

How should IS, still in the early stages of this insurrection, deal with the insurgents? The reactions can range from blithe indifference to stern repression — or perhaps the forging of a new, cooperative relationship that recasts the roles of both the users and the IS function.

The latter course was taken by the retail information services group at John Hancock Mutual Life Insurance Co. in Boston. Carol Newman, a general director within the group, recognized the need to take on a proactive role in the growth of end-user computing as opposed to simply developing a long-range plan for PC hardware.

In the middle of 1987, Newman's group assumed the responsibility for shifting the hardware core of some applications from mainframe-based dumb terminals to PCs.

"One of our first jobs was to migrate a PC application — the creation of sales proposals — from the mainframe to PCs in the field," she says. "Because

MAX SEABAUGH

Kirkley is a computer industry writer, editor and consultant based in Warwick, N.Y.

- **Recasting of user, IS roles**
- **"Liberte, Egalite, Fraternite"**
- **To decentralize or not?**

the equipment was not to be installed for nine months, we had a window to plan for the switchover."

So Newman took the time to contract with the Boston Systems Group, Inc. (BSG), a management consulting firm specializing in strategic planning, to help John Hancock create an environment that would draw from its past experience with mainframe applications and BSG's expertise with PC applications.

Among the work done by the retail group and BSG was the development of a systems methodology for the applications and the creation of a standard user interface. Standards and PC connectivity are especially critical for Hancock's corporatewide computing strategy.

"The company strongly supports decentralization," Newman points out. "It's a very interactive process. One of our jobs is to make sure the users understand the importance of standardization and take a methodical approach to the introduction of technology."

BSG's president, Theodore Klein, worked with Hancock to create an environment in which the PC application could flourish.

He adds that developing such a strategic plan, which takes into account the continued introduction of PCs and the rise of end-user computing, is essential in today's IS environment. Klein's company deals mainly with Fortune 500 companies; he says, "They are all handling the personal computer differently."

BSG's Klein

The big question is the role of IS — just who is to be in charge of building these networked, applications-oriented end-user systems?

"The companies we have worked with range from the extremes of total hands-off — where MIS says, 'We'll have nothing to do with PCs, they are strictly a departmental concern' — to companies where the mainframes have been thrown out and the entire corporation is linked by PCs and workstations," Klein says. "Most fall somewhere in the middle and are at various stages in their development."

The middle ground is the territory being occupied by Hasenyager's organization at Merrill Lynch. Since joining the company in 1986, he has been busy consolidating all the systems development resources that support the company's chief financial officer and chief administrative officer.

"Workstations or PCs are windows into the world of applications," Hasenyager says. "As our systems become more and more integrated and transparent, it becomes increasingly difficult to know where the data is. But that's not really an end-user concern. Today fewer people are concerned with complex technical details; we increasingly focus on what needs to be achieved."

As at Hancock, Hasenyager points out that Merrill Lynch has no specific, separate, strategic PC plan. "Our systems plans are directly connected to the company's strategic business plan," he says. "Our systems plans, which have implications for mainframes and networks, as well as PCs and workstations, were designed to be enabling, to bring to the business people the capabilities they are going to need in the future without our having a total certainty about the direction their business will take."

PC infiltration

Naomi Karten, a Randolph, Mass.-based consultant who specializes in end-user computing, agrees with Hasenyager that PCs are generally considered part of an overall strategic plan. "But," she cautions, "PCs are still coming into the corporation in unplanned ways."

The problem, she says, is that the information centers and other end-user support groups are inundated with work.

At the same time, PCs continue to infiltrate corporations in large numbers, which is a trend that can lead to "faulty applications and bad business decisions." Under these circumstances, "Users are contributing to catastrophe," she says. Understaffed support centers are often unable to cope.

> "WHEN YOU buy PCs by the thousands, you tend to view them as just another tool — not much more than a chair or a table."
>
> BRUCE HASENYAGER
> MERRILL LYNCH

"Today's users are reliving all the old DP problems," Karten continues. "But at least the early MIS people were familiar with planning methodology and knew they had to test applications." These days, more sophisticated users are presenting new, more sophisticated challenges to IS.

Meeting those challenges head-on is Pillsbury Co., headquartered in Minneapolis. Under the guidance of Terry Marksherry, director of management systems, Pillsbury has become a leader in

deploying local-area networks to link its PCs and workstations.

Marksberry says Pillsbury's minimum standard for a PC had been an Intel Corp. 80286-based machine, but because end-user applications are increasing in size and complexity, Intel 80386-based Compaq Computer Corp. units are becoming its PC of choice. The company has a two-tier architecture: The PCs are connected directly to the IBM 3090 mainframe.

Marksberry's group worked closely with Compaq and Novell, Inc. to develop an extensive LAN network, running 10M bit/sec. Ethernet over twisted-pair wiring. At the headquarters, 20 servers operate on a fiber-optic backbone.

"The PCs on the LAN are the gateway to the mainframe," he says. "We have a rising demand for connectivity. ... A year ago we had zero people using LANs; now there are over 700. By the end of this year, we plan to make LANs available to almost everyone in our General Foods subsidiary population."

> "THE PC PLAN cannot be drawn up separately from the overall strategic plan. Companies that do this will be in big trouble five years from now."
>
> LESLIE FIERING
> BANKERS TRUST

With the increase in PC and network usage, Marksberry, like Karten, says he is beginning to see users go through many of the same traumas suffered by IS in years gone by. With their newly acquired expertise with spreadsheets, databases and fourth-generation languages, users are turning to IS for help in developing applications. The result is the beginning of a new backlog of PC applications.

As for the PC hardware, Marksberry also says it is regarded in much the same way as a telephone — in many cases, it is an essential device that is part of every new employee's equipment. When viewed strategically, PCs are handled much like any other technology — they must support the company's business goals and objectives.

The pervasiveness of PCs is underscored by the existence of organizations like the Microcomputer Managers Association (MMA). The New York-based association, founded in the early 1980s, draws most of its more than 500 members from Fortune 1,000 companies. Leslie Fiering, an assistant vice-president at Bankers Trust Co. in New York, is a member of the MMA's executive board.

Fiering's view of creating a separate strategic plan for the acquisition and implementation of PCs is simple: "The PC plan cannot be drawn up separately from the overall strategic plan," she asserts. "Companies that do this will be in big trouble five years from now."

Fiering contends that "the swing toward decentralization is over," in that the corporate IS department must be heavily involved in planning PC purchases and use. Distributed processing is a widespread reality and "someone has to provide the coordination," she adds. "In most cases, it's corporate MIS."

Fiering urges companies to plan centrally but implement locally. Technically gifted people are certainly needed at the user level, she admits, but they also must be able to understand the users' problems. She also stresses the importance of PCs and connectivity and sees the biggest challenge to IS as building a viable communications infrastructure.

Pillsbury's Marksberry

'That's life'

The Emhart Corp. in Hartford, Conn., is still highly decentralized, and just keeping track of its diversified businesses is a major challenge. Emhart has more than 20 separate business units and 30,000 employees worldwide. "We've standardized on IBM, DEC, DG, Unisys, HP, Datapoint, NCR . . . ," laughs David Dandro, vice-president of information systems. "It's not a problem — that's life," he says.

At Emhart, PCs are used strategically by the corporate staff and the business units, and they are key elements in many applications. At one major location, sales representatives are using Grid Systems Corp.'s Grid Lite laptops in the field to enhance their productivity and gain a competitive edge. A key use is accessing the unit's mainframe using the laptops and Cullinet Software, Inc.'s IDMS database to obtain customer data.

In another instance, Emhart corporate staff worked closely with Orion Micro Systems, Inc. in the early development of a PC-based software package called FDC/Pyramid. The commercial software streamlines the collection of monthly financial data from the business units, reduces errors and considerably speeds up the consolidation and reporting process back at headquarters.

As far as creating separate long-range plans for PCs, Dandro says, "We don't develop strategic plans for telephones or

Continued on page 98

Who controls PC plans?

Is MIS involved in personal computer planning? When John M. Blair of The Dooley Group in Carefree, Ariz., dipped into the database that his group has maintained since 1985, the results were revealing.

Blair found that in most companies, PCs represent a total computing resource greater than the central system maintained by MIS. "The planning for the use of the personal computer resource is, at best, ad hoc and fragmented," Blair says. "Budgets are the extent of most plans."

He looked at a sample of 50 surveys completed in 1987 and 1988, and from their collective base of more than 250 respondents, zeroed in on MIS involvement in PC planning. He asked several yes-or-no questions.

When asked, "Are PCs budgeted outside of MIS?" 82% of the respondents said yes, and 18% said no. To the question, "Does the IS plan include end-user architecture?" 88% said yes, and 12% said no. The query, "Does the IS plan include micro applications?" garnered 74% yes and 26% no answers. And finally, when asked, "Does the IS plan include the information center?" 56% said yes, and 44% answered no.

According to Blair, "One way to interpret this data is that MIS provides an on-demand consulting service through the information center to those who purchase the PCs. MIS does little to provide an infrastructure to guide and facilitate the use of information technology."

> "THE PLANNING for the use of the personal computer resource is, at best, ad hoc and fragmented. Budgets are the extent of most plans."
>
> JOHN M. BLAIR
> THE DOOLEY GROUP

Three firms that participated in the surveys were selected by Blair as representative of a spectrum of approaches.

One, a utility company, has strong central control of the PC budget and carefully determines who receives PCs and what software is used. Their long-range planning included an emphasis on mainframe applications and networks to support these applications. One PC user nearly lost his job when he independently contracted with a solo programmer to develop software to integrate several mainframe applications so he could do them at his PC.

At the other end of the spectrum is an organization that provides support to its PC users through an information center and provides a PC programming support staff that develops mainframe applications.

Somewhere in the middle, and typical of many organizations, is an IS department for a large city government. A well-regarded information center provides on-demand services to the users. No attempt is made to plan or influence the use of technology. In this particular setup, the information center is generally biased toward IBM-compatible hardware, but there is a growing base of Apple Computer, Inc. Macintosh users.

"The senior MIS executive at the utility and at the city share a general concern regarding their planning and the service provided for personal computers," Blair points out.

"Both believe a far greater integration of microcomputers, mainframes and minicomputer systems is inevitable. [But] both have been unable to move their middle management to do any meaningful work on realizing this integration of technology," he claims.

JOHN KIRKLEY

Revolution

CONTINUED FROM PAGE 97

workstations. We've increased our threshold of pain as far as allowing users to select what they want."

At Emhart, the fundamental business applications are not being written by users with PCs, Dandro says. These are still run on minicomputers and mainframes. But within the units, a whole range of PC-based tools are available to help them do their work.

"Our role at corporate," he points out, "is to provide planning and oversight to all Emhart's companies. We have to respond to each unit's particular needs."

As end-user computing becomes more widespread, new users will begin to turn to new technologies to help make business decisions.

Patricia Seybold, head of Patricia Seybold's Office Computing Group in Boston, looks beyond today's end-user revolution and observes that, over the next five years, business executives will become the next significant segment of PC users. They will require flexible, easy access to databases and the ability to generate and retrieve reports customized for their specific use. Artificial intelligence-driven, object-oriented programming languages that act as intermediaries between the database and the user will he needed. (See story page 103.)

"MIS soon will need to recruit new programmers who can deal with this

changing environment — people who are familiar with AI and object-oriented languages," Seybold points out.

Moving in that direction, she says, are systems like Metaphor Computer Systems, Inc.'s Metaphor, a flexible set of tools that allow users to create simple to very elaborate applications programs. New Wave from Hewlett-Packard Co. and Digital Equipment Corp.'s Compound Document Architecture are also steps in this direction.

No easy answers

Because IS is in the midst of the end-user revolution, aided and abetted by new tools and the rapidly increasing power of desktop computing, there are no easy answers when it comes to planning the role of PCs as a part of the "strategic computing initiative," as BSG's Klein calls it.

What is apparent is that focusing on the PC as a discrete element in the overall information systems structure is taking an extremely myopic point of view. As Elaine Bond, vice-president of corporate systems at Chase Manhattan Bank Corp., has observed, "The network has become the computer."

IS is in the process of building complex, integrated systems that will allow users to build applications not even dreamt of today.

Emhart's Dandro points out, "We need to stimulate the users to come up with more interesting applications, rather than becoming enamored with the technology. •

IS reckons with growing strength of end-user cause

Those information systems managers who ignore end-user computing do so at their own peril. End-user computing is a major force to be reckoned with concludes a survey by the American Management Association (AMA) last year.

In "The AMA Report on End-User and Departmental Computing," Gerald M. Hoffman, an independent consultant based in Chicago, says, "At some point, [end-user computing] will become so large in cost and/or so pervasive in application — for example, a warehouse with its own inventory control system — that it will require thoughtful managerial attention. It will also acquire its own name: departmental computing."

The report, which surveyed IS managers at 295 organizations, was conducted with the cooperation of New York-based Microcomputer Managers Association. Hoffman was one of the primary researchers for the report.

In addition to the survey, association members participated in four separate roundtables.

Good to have connections

The report confirms the claims that connectivity is king. Organizations said they added personal computers and mainframe/mini terminals at a far greater rate than stand-alone units.

Another finding is that the "Year of the LAN" may have already occurred, with two-thirds of the large-company work sites having local-area networks in operation in at least one department outside IS; 41% of the midsize companies have followed suit. About 84% of the companies reported that they have PCs linked to mainframes or minis or networked with one another, and that percentage is expected to grow rapidly.

AMA's Hoffman

The report focuses on the changes that end-user computing is creating within the department information structure and contends that the information center is a maturing and viable entity that will continue to expand. The report's final section, "So Much to Do, So Little Time," covers the issue of training.

Summarizing the findings, Hoffman notes that 43% of the organizations have at least one user department with sole responsibility for its internal budgeting and financial management applications. Users also have substantial control over departmental writing, word processing and, to a lesser extent, presentation graphics, list processing and computer-aided design.

According to Hoffman, user departments must assume primary managerial responsibility for at least some of the key computing and information systems required to manage the department. "The departmental management must deal with all the issues with which [IS] management deals, albeit on a smaller scale," he says. The problem is, Hoffman notes, that user departments are seldom equipped to handle this responsibility, leading to "a situation fraught with peril."

For IS, the end-user computing trend means "redefining its role from provider of all information services to provider of a framework within which the applications can be built and operated, either by [IS] or others." More information about the report is available from the AMA at 212-903-8052.

JOHN KIRKLEY

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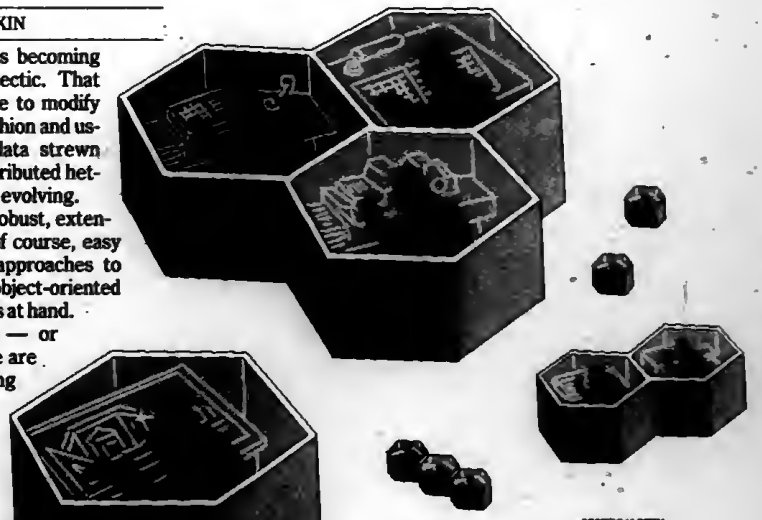
Object orientation: What it can do for you

From operating systems to user interfaces, commercial viability is near

BY MICHAEL D. MILLIKIN



SCOTT BALDWIN

Today's business environment is becoming increasingly fast-paced and hectic. That means businesses must be able to modify their applications in a timely fashion and users must be able to access data strewn across the larger and more distributed heterogeneous networks currently evolving.

Software must be modular, robust, extensible, portable, reusable and, of course, easy to use. One of today's best approaches to meeting these needs is to apply object-oriented products and concepts to the problems at hand.

Many technologies appear to be — or claim to be — object oriented. There are object-oriented languages, operating systems, user interfaces and databases. There are new environments that vendors insist offer true object orientation, and there are older environments adapted or enhanced to provide object-oriented functionality. How can today's information systems manager sort it all out? Can one label apply to all of these things in a meaningful way?

Essentially, yes. There is no one central science of object orientation from which the various manifestations spring. Rather, developers and researchers have applied the sundry concepts of object orientation in their respective disciplines in an uncoordinated way.

But the basic idea is fairly simple: Objects are, from a very high-level view, any entities that exist uniquely in time and space. In other words, they have "state," and they are characterized by the actions they perform upon other objects and by actions performed on them.

Objects can function as actors, as agents and as servers, depending on their relationships to other objects. Actors operate on other objects, servers are only operated on, and agents perform operations on the behalf of other objects.

Object orientation also relies upon the notions of class and inheritance. A class is a general category of similar objects. Objects created within a class by definition inherit the basic attributes common to that class.

In the application sense, objects are combinations of data and code. The object carries within it the capability of acting upon itself. For example, rather than having two separate entities — a spreadsheet application and a data file, for example — for working on a quarterly report, an object-oriented system would offer a "Quarterly Report Object." Within the object would be the data and the appropriate object editor allowing for that data's manipulation.

An object-oriented operating system, in turn, would perform actions — filing and retrieval, for example — on objects, rather than on different types of data files. This abstraction — dealing with a general object rather than with specific discrete types of files — gives a great

Millikin is vice-president of Boston-based Patricia Seybold's Office Computing Group, which is sponsoring its third annual technology forum, "Object Orientation: Defining the End-User Platform for the 1990s." The forum will be held in Cambridge, Mass., April 3 to 5, 1989.

- **Unique existence in time and space**
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- **Religious wars erupting over purity issue**

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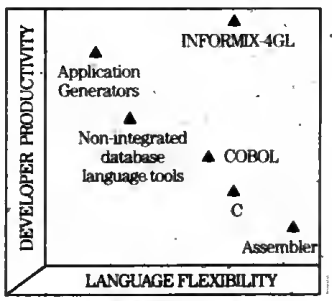

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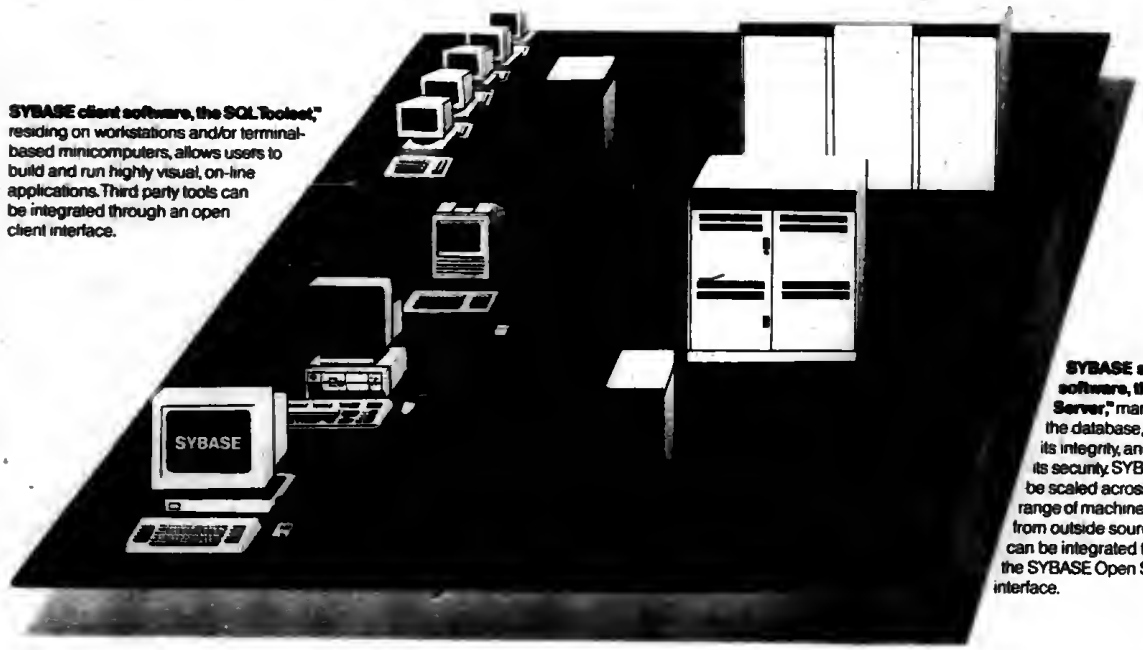

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deal of flexibility to the system.

Object orientation is not a new concept. In the early '60s Doug Engelbart, then at SRI International in Stanford, Calif., worked with the Augment system toward providing an interface that supported direct manipulation and spawned much of the interface work occurring now. Object-oriented programming was first discussed in Norway in the early 1970s in connection with the Simula language.

Thus, in effect, object-oriented concepts are between 15 and 20 years old. However, several factors occurring today are driving the current commercial adoption of these techniques.

One of these factors is hardware. Technology is now more affordable than in the past. Professionals can have high-performance workstations on their desktops at a reasonable price. These types of workstations are particularly necessary for delivering the graphics-based object-oriented environments to the end user.

However, not all manifestations of object orientation require gee-whiz workstations with megapixel displays, mainframe-class processors and half a gigabyte of storage. Object-oriented techniques can improve even more traditional software design. IBM, for example, has already implemented an object-oriented operating system on its Application System/400 mid-range processor.

Increasing technological complexity may be cited as the primary driver behind the current move to object orientation. The concept provides a way of dealing with complexity in general and with complex systems in particular. This management of complexity spans many levels and implementations, from offering abstraction in software design to enabling direct manipulation of complex objects by the end user.

Areas of interest

In order to systematically examine object orientation, the current spate of object-oriented products should be divided into four areas:

- Operating systems.
- Programming languages.
- Databases.
- User environments and applications.

Within each of these areas, there are several concerns common to today's IS professionals:

- **Implementation and migration.** Implementing an object-oriented database on the engineering side is not necessarily a troublesome task — indeed, the scientific and engineering market has been relatively untapped by the relational database management system vendors.

However, taking a major IDMS/R or DB2 application and trying to migrate the application and the data to an object model could become quite an Augean task.

- **Hardwood vs. veneer (pure vs. hybrid).** Although object orientation is broad in scope, religious wars are already erupting over the proper and most functionally pure implementation of object-oriented N, in which N represents just about anything: databases, applications, user interfaces and so on.
- **Coexistence and compatibility.** Because the world is not moving to object orientation overnight, IS management will long bear the burden of providing some sort of compatibility and coexistence between the new object-based solutions and the older technology. This could become particularly sticky in the end-user environments.

An object-oriented operating system by definition operates on objects rather than on specific

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types of data files. Two current examples are Biin's Biin-OS and IBM's OS/400.

Biin, a company formed by Siemens Information Systems, Inc. and Intel Corp. and located in Hillsboro, Ore., is offering object-oriented, tightly coupled multiprocessing built atop a reduced instruction set computing-like CPU. Biin is optimizing its systems for on-line transaction processing.

Biin-OS incorporates many record I/O functions and transaction processing services, rather than relying upon the individual relational database management system packages for those functions. In addition, it delivers the Iicons desktop user interface, which allows users to view and manipulate files, tools and other objects as images on a desktop screen.

In IBM's OS/400, everything that can be stored or retrieved is contained in an object. These objects free the users from the implementation techniques or addressing structures specific to a machine. When OS/400 stores a scanned image, for example, all it knows is that it is storing an object. It does not know what is in that object. In the same way, the object itself has to make no special accommodation for innovations in the machine or system.

OBJECT-oriented design produces modular, reusable code particularly suited for reducing the time required to produce complex software systems.

Consistent interface

Thus, one of the key attributes of an object-oriented operating system is the availability of a consistent instruction interface that enables both the operation and use of machine resources through object names, while at the same time remaining hardware independent. Bringing in new technology at a machine level, therefore, becomes much easier to do.

Future versions of mainstream Unix are expected to be object oriented as well. Currently, there are a variety of specialized approaches providing object orientation atop a Unix-like base, like Biin-OS, which implements Unix primitives, and Mach, the operating system used in Palo Alto, Calif.-based Next, Inc.'s workstation, which is currently in initial delivery phase.

If any area is ripe for immediate payback from the implementation of object-oriented concepts and products, it is programming. James Martin, noted IS author and consultant, has pointed out the productivity enhancements possible through object-oriented information engineering — less code needs to be written.

Some early critics have accused object-oriented programming of extracting an unacceptable performance hit. Recent enhancements to the mainstream languages, such as C++, have invalidated this complaint.

Object-oriented design produces modular, reusable code particularly suited for reducing the time required to produce complex software systems. In addition, IS can enjoy a lowered cost of software maintenance through the creation of this reusable code.

Application of object-oriented design methodology to programming is producing some impressive savings. Recently, programmers at the U.S. Marine Corps, for example, applied these techniques to developing some Ada-based IS applications and were able to produce a prototype in two weeks, compared with the more typical time frame of six to eight weeks.

An added blessing on the market has been conferred by Microsoft Corp. and IBM, which have promised object-oriented programming tools for OS/2. On the AIX side, IBM is expected to offer Next's Next Step interface-building software to its users as well.

There are a number of programming languages that have contributed mightily to the evolution of the object-oriented

concept, beginning with Simula 67. In addition to Smalltalk, there are a variety of languages implementing a range of object-oriented concepts. These languages include Flavors, Loops, Actors, Object Pascal and Ada.

As Grady Booch — director of software engineering programs at Rational, a software developer in Mountain View, Calif., and a proponent of object-oriented software design for a variety of languages — has noted, "Object-oriented programming [is] not a binary issue, but rather . . . a spectrum that encompasses a number of languages."

In addition, vendors bringing new object-oriented software systems such as databases to market can add their own object-oriented programming language, as Servio Logic Corp. did with its Gem Stone.

Currently, there is a debate over which language will be chosen as a de facto standard for widespread commercial-scale object-oriented programming. The choice today is between pure object-oriented languages such as Smalltalk and hybrid languages such as C++ or Objective C.

Smalltalk has the distinction of being one of the oldest object-oriented programming languages around, as well as having some distinguished parents: Alan Kay, Adele Goldberg and Daniel H. H. Ingalls, who worked on Smalltalk at Xerox Corp.'s Palo Alto Research Center.

Everything in Smalltalk is an object, including classes themselves. This lends both a conceptual and a practical consistency to the language. Smalltalk's emphasis is on dynamic binding at runtime.

Smalltalk is more of a programming environment than a language. In addition to supporting object-oriented concepts, it offers a consistent, object-oriented user interface.

Smalltalk popularized the now-prevalent user environments of multiple windows, icons, text/graphics integration, pull-down menus and mice, making it attractive to a large number of developers and researchers.

Adding to C

C++, defined by Bjarne Stroustrup at Bell Laboratories in 1983, combines object-oriented features on top of the traditional C language. C++ actually functions as a preprocessor for C; the C++ compiler is used to convert C++ code to standard C code, which a standard C compiler then converts to machine code.

One major benefit of this approach is the ability of C++ to work with a variety of existing C compilers. This capability allows developers to port C++ applications to environments that as yet have no C++ compiler of their own.

The developers need only compile C++ to C in the development environment and then take that C code over to the target environment to use the C compiler there.

The other hybrid C language that attempts to exploit the benefits of object-oriented programming is Objective C, which was developed by Brad Cox, vice-president and chief technical director at Stepstone Corp., formerly Productivity Products International, Inc. Objective C made a lot of headlines when it was chosen by Next Chairman and Chief Executive Officer Steve Jobs as the foundation for the company's Next Step environment.

Objective C also functions as a preprocessor for traditional C. In design, however, Objective C is closer to Smalltalk than C++ is and offers comparable dynamic binding.

Programmers will no doubt be slugging it out for years over which product is the most appropriate object-oriented programming language. IS managers have some more real-world concerns, however.

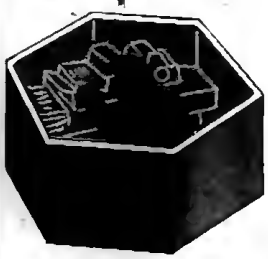
For many IS managers, the first pass at an object-oriented programming language will be based on the capabilities of their programmers. There are probably more corporate developers out there familiar with C than with Smalltalk.

In addition, C is one of IBM's strategic Systems Application Architecture languages. (Of course, there are probably even more programmers familiar with Cobol than with C, but that is

a different issue.)

One real advantage of the hybrid object-oriented languages is the retention of familiarity. Programmers are not confronted with a totally unfamiliar programming methodology.

One concern that may tilt IS managers' preference for C++ or Objective C is the availability of compilers. Basing strategic applications on a language for which there are few alternate sources of compilers is not a formula for job longevity.



Both Objective C and C++ have major corporate support: IBM for Objective C and AT&T for C++. C++ has the advantage over Objective C in terms of multiple sources for compilers, and that edge will probably continue. Language battles aside, however, programmers can exploit object-oriented software design concepts even with traditional languages.

Databases

New vendors, such as Servio Logic and Ontologic, are beginning to roll out object-oriented databases, and the established database vendors are working on object-oriented enhancements to existing products.

Like object-oriented programming languages, object-oriented databases are particularly adept in handling complexity through the exploitation of the concepts of class and inheritance.

Some of the products, such as Ontologic's VBase, are targeting the engineering and scientific communities — groups that typically have had little support from the traditional relational database vendors.

Other vendors, such as AIcorp, Inc., are applying object-oriented techniques in front ends to existing databases. This method is one way to handle the migration and implementation question.

AIcorp's Knowledge Base Management System (KBMS), for example, uses objects as the foundation for its knowledge and data representation scheme. In KBMS, objects contain rules, such as data validation rules. By incorporating such rules or functions into the object, KBMS frees users from re-creating the validation procedures for each new application.

Established database vendors such as Oracle Corp. and Informix, Inc. are hard at work on incorporating object orientation in their offerings.

Hewlett-Packard Co. is doing some interesting work with its Iris database, combining object-oriented technology with existing relational databases.

The user environment

The fog gets pretty thick in exploring the area of object-oriented user interfaces and applications. In essence, the goal of object orientation for the end user is to provide an environment that supports direct manipulation.

To print a document, for example, a user would drop a document icon on top of a printer icon, rather than launching the word processing package, loading the appropriate document and then telling the application to print the document.

Direct manipulation allows the user to concentrate on the business task at hand, rather than on the mechanics of the application.

So instead of figuring out how to get to the command line, for example, and then trying to figure out where the data file is stored, users can simply open the appropriate object and go to work on it.

We have a range of examples of such a capability today. The Apple Macintosh, for example, represents discrete files as icons but stops short of providing an interface that supports full direct manipulation.

HP's New Wave software provides a greater degree of functionality by offering object management and handling on top

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of existing operating systems and applications — DOS now, OS/2 and Unix to come. Metaphor Computer Systems, Inc.'s Metaphor software program, on the other hand, creates an environment within which users can access a full object-oriented environment, but that environment is closed to existing applications.

Future visions

Mitch Kapor, first the creator of Lotus Development Corp. and now head of On Technology in Cambridge, Mass., has said that he envisions the ideal scenario as delivering to the end user a modular environment in which object tools from a variety of vendors are integrated to create a seamless whole — in other words, he predicts the openness of today's DOS world combined with the functionality of the Metaphor world.

But because we are not yet in that end state in which monolithic applications are replaced by compatible object tools, we encounter a variety of troubling issues.

LIKE IT OR NOT, users will require more sophisticated tools to enable them to produce the ad hoc applications required by a specific business situation.

The issue that requires the most attention is the notion of compatibility with existing applications. Take, for example, the Metaphor environment as an example of a pure object-oriented environment. When implemented on an IBM Personal System/2, Metaphor will be able to access data from existing DOS and OS/2 applications. It will not, however, be able to actually launch those applications. It is not the same as trying to run a non-Microsoft Windows application within a window.

HP is offering encapsulation as a technique to support existing DOS applications within the New Wave environment with some degree of object-like functionality.

However, that presupposes a willingness on the part of independent software vendors to spend an additional 10% or 20% of programming time on encapsulating an application that might be selling very well in its current state.

At this level of the workstation market, much will depend on what IBM — with both Metaphor and Next Step — HP with New Wave and Microsoft with an as-yet-undisclosed offering decide to do in promulgating a standard approach for object management.

Aside from user productivity through direct manipulation, the other significant payoff of object-oriented technology in this area is in user-developed applications.

Wanted: Sophistication

Like it or not, users will require more sophisticated tools to enable them to produce the ad hoc applications required by a specific business situation. Metaphor's great strength, for example, is its capability to serve as a front end for databases with an environment that allows users to graphically construct applications using that data.

All the attributes of object orientation that make it attractive to professional programmers also make the basic technology, albeit packaged in an environment accessible to the nonprogrammer, attractive to the user community as well.

Unlike some fads, object orienation is not just hype. But neither is it an all-or-nothing implementation.

There are very real methods to make immediate gains from the application of object-oriented design techniques. To benefit from the technology, it is crucial for IS executives to indulge in some longer range planning in conjunction with the appropriate vendors.

Most important, IS management needs to determine its implementation strategy for delivering the power of object-oriented applications and environments to the target audience that will benefit the most — the end-user community. •

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INDUSTRY INSIGHT

Nell Margolis

Solution pollution

Last week, a Berkeley, Calif., jury convicted a defendant of petty shoplifting. The defendant — I kid you not — was named Mr. Badness. The trial took four days. Think about it: only four days to get Badness out of Berkeley.

Maybe the jury would be willing to take a few more days and try getting Solutions out of the computer industry.

Of course, they had only one Badness to deal with, and if you go by the past few months' worth of press releases, there are hundreds, maybe thousands, of Solutions out there. In fact, it appears that the Solutions industry has grown to be a little more than twice the size of the computer industry.

I'm not unsympathetic toward the folks who decided to get their companies out of such commodities as hardware and software and into Solutions. Once done, the die was cast. Faced with competitors that peddle Solutions, which among us would be foolhardy enough to proffer mere applications? What's more, Solutions ven-

Continued on page 119

MIS should tune in HDTV

The up-and-coming technology a crucial linchpin to the future

BY NELL MARGOLIS
CW STAFF

High-definition television (HDTV) is in the limelight these days, but do MIS directors need to care about what seems to be largely a consumer electronics battlefront?

"If they care about keeping their jobs in about five years, yes, they do," said Norman Weizer, a computer consultant at Cambridge, Mass.-based Arthur D. Little, Inc.

The U.S. electronics industry has held up the HDTV issue as a crucial linchpin to future technological development. No MIS director can afford to view the potential erosion of the U.S. computer industry with equanimity, said Robert Curran, executive director of computer services and telecommunications at Medford, Mass.-based Tufts University. "If we abandon a technology like HDTV, that technology will be developed by others, for the purposes of others," he said. "We'll lose a great amount of control." U.S.-based MIS directors, Curran added, are likely to have little clout with Japanese and European developers.

HDTV is more than a bigger and better television set, said Stephen Cohen, director of Berkeley Roundtable on the International Economy in Berkeley, Calif. It is the technological bridge between today's market and a rapidly approaching digital-based electronics/computer industry in which the barriers between televisions and computers no longer exist.

Currently, the consumer electronics industry is heavily reliant on analog technology, while the digital-based computer industry relies on different components to build different products, generally for business customers. But with the new market that "digital fusion" ushers in, Cohen said, computer companies will duke it out with consumer electronics makers for the same customers. When they do, he said, the winners are likely to be the companies that have pulled ahead in research dollars and depth, thanks to what they have earned and learned in their years of HDTV production.

For instance, Cohen said, "HDTV provides the occasion for high-quality mass production of chips." If Japan or any other country becomes dominant in the chip arena, currently a U.S.

Continued on page 120

MARTHA EVERSON

Tufts Curran wants his HDTV

It's HDTV or no PCs

How badly could the U.S. computer industry be hurt by the country's failure to establish major presence in the HDTV market?

The American Electronics Association addressed the question in a study published last fall and came up with disturbing answers.

Take PCs, for instance; the point is, somebody might. . . .

U.S.-owned companies currently command approximately 70% of the worldwide PC market.

If the U.S. can claim a 50% or higher share of the domestic market in HDTV products by the year 2010, the study concluded, it will hold its 70% market share in PCs.

If, however, 10% or less of the U.S. HDTV products market is attributable to U.S. companies at that time, according to the study, the U.S. could lose 50% of its worldwide PC market share.

A demotion to 35% shareholder of the worldwide PC market, the study said, would cost the U.S. $110 billion in the year 2010 alone.

Consortium sought for optical chip research

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The David Sarnoff Research Center is trying to interest the government in partially funding a new kind of electronics industry consortium — one that would actually make and sell a product.

Specifically, the proposed consortium would develop, and eventually sell, optoelectronic integrated circuits, which use high-speed, optical transmitters and receivers to make interconnections between chips. This would replace the current use of wired-pin connections.

"This venture would be an extremely cost-effective way for U.S. semiconductor, computer, communications and aerospace industries to control the supply of their key components," noted Carmen A. Catanese, vice-president of Sarnoff's Solid State Research Division in Princeton, N.J.

The technical cornerstone of the Sarnoff proposal is a new semiconductor diode laser recently developed by the center, called the Grating Surface Emitting laser. This laser-in-a-chip emits a light that is 100 times brighter than any previous device, enabling chip-to-chip communication at rates in excess of 1G bit/sec., according to Sarnoff researchers.

The goal would be to overcome the bottleneck caused by electrical interconnections in the chip, between chips and between circuit boards, Catanese said. Applications for optical circuits include advanced computer graphics, product simulation, robotics, defense electronics and telecommunications switching.

Sarnoff officials said the project will require about $15 million in start-up costs for the first year.

"We hope to see this kind of venture become the primary role model for future business consortiums in the U.S.," said James J. Tietjen, president of the center, a subsidiary of SRI International.

Chip maker reconciliation oceans away

BY JEAN S. BOZMAN
CW STAFF

SANTA CLARA, Calif. — East met West in Silicon Valley last week as major Japanese semiconductor manufacturers arrived to address their U.S. counterparts. But any reconciliation between the two still seemed far away.

The Electronic Industries Association in Japan (EIAJ) held a day-long seminar here to reach out to U.S. suppliers of chip components. The meeting was part of a September 1988 action plan to build long-term relationships between Japanese firms and foreign chip suppliers. But it came just a week after the U.S. Semiconductor Industry Association (SIA) asked U.S. Trade Representative Carla Hills for help in gaining access to the insular Japanese computer market.

"We want to emphasize as strongly as we can that the Japanese market for semiconductors is wide open to U.S. semiconductor suppliers," said Toori Sato, chairman of the EIAJ's Users Committee of Foreign Semiconductors.

SIA members, however, were not convinced. U.S. semiconductor suppliers have maintained a relatively low profile in Japan. Last year, they generated about $2.1 billion in Japanese sales, which amounted to less than 10% of the Japanese semiconductor market, according to the EIAJ. However, the number of "design-ins," meetings in which U.S. engineers visit Japanese companies to refine product specifications, rose from 100 to 120 in 1987.

Sato claimed that U.S. firms failed to penetrate their market because of ongoing mismatches between the Japanese need for application-specific integrated circuits related to auto and consumer electronics products and the U.S. supply of standard memory and merchant chips for computer and office systems.

Even so, Kazuhiko Toyama, vice-chairman of the EIAJ Users Committee, cited some recent examples of trans-Pacific cooperation: Texas Instruments, Inc., he noted, supplied Hitachi Ltd. with 16M-byte dynamic random-access memory chips for computer memory and took over the manufacture of certain TTL chips for NEC Ltd; Motorola supplied Toshiba Corp. with a motor-drive circuit for compact-disc players; and Intel Corp. made an 8-bit microprocessor for Hitachi's VCRs.

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Miniscribe's troubles escalate

BY JULIE PITTA
CW STAFF

LONGMONT, Colo. — The recent resignation of Miniscribe Corp. Chairman and Chief Executive Officer Q. T. Wiles was the latest piece of bad news to come from the troubled disk drive manufacturer.

It is unlikely to be the last: Early this month, the firm announced its intention to lay off 250 workers, bringing the company's total work force down to 6,000. Last year, Miniscribe employed 8,350.

Industry watchers said Miniscribe has suffered from competitive pressures, including rampant price cutting, in the disk drive industry.

"Miniscribe is one of several companies that got a bit mangled at the end of last year, when it became clear that the industry was producing more than the market could bear," said Robert Katzive, vice-president of Disk/Trend, Inc., a Menlo Park, Calif.-based market research firm. "There were 10 companies shooting for 40% market share and gearing up their production and inventory accordingly."

Wiles has headed the company since 1985, when San Francisco-based Hambrecht & Quist, Inc. wrested control of the company through a $20 million cash infusion. Hambrecht & Quist holdings in the disk drive manufacturer are currently estimated at 20%.

According to a company spokesman, the 70-year-old Wiles has relinquished his position because he felt he could not spend the time and energy necessary to run the company. A longtime director of Hambrecht & Quist, Wiles is considered the firm's turnaround expert. He sits on the boards of a number of companies in which Hambrecht & Quist has a stake. Replacing Wiles is another Hambrecht & Quist executive, Richard Rifenburgh.

Until its stumble in the fourth quarter, Wiles had been credited with saving Miniscribe, which lost its contract with IBM in 1985. IBM had been Miniscribe's leading source of revenue.

IN BRIEF

Nixdorf president departs

Ending his seven-year tenure as president of Nixdorf Computer Corp. of North America, IBM veteran Michael Anderson has joined NEC Information Systems, Inc. as executive vice-president. Meanwhile, Nixdorf board member Albert Holler has stepped into the presidency vacated by Anderson — a first-time occurrence for the Waltham, Mass.-based subsidiary of the West German computer giant.

Largo key to AT&T

AT&T last week unveiled its Largo, Fla.-based data communications equipment subsidiary, AT&T Paradyne. Born of the union between an existing AT&T operation and the company's recently acquired Paradyne Corp., the subsidiary exemplifies AT&T's recently announced strategy of launching businesses that home in on specific customer and product groups, a company spokesman said.

And the beat goes on . . .

Tape drive and optical disk drive maker Cipher Data Products, Inc. is tendering $13 per share for all shares of Irwin Magnetic Systems, Inc.

. . . and on . . .

Sungard Data Systems, Inc., purveyor of investment management systems to the financial services industry, is poised to acquire investment management software company Money Management Systems, Inc. Money Management President Jay Goldberg will continue to manage the company after the acquisition, according to a Sungard spokesman.

. . . and on

Sausalito, Calif.-based computer-aided design player Autodesk, Inc. is buying privately held Generic Software, Inc., a maker of low-cost computer-aided design (CAD) software. The acquisition will create a combined company with an installed base of close to 500,000 CAD users, Autodesk said. Generic Software will reportedly retain both its president, Bob Fulton, and its Bothell, Wash., location.

Public offering

Bytex Corp. is taking its fault-tolerant electronic matrix-switching business to the public. The Southboro, Mass.-based company anticipates its initial public offering of 1,350,000 shares of common stock to be priced at $8 to $10 per share.

Hughes snags last on the block: Sytek

BY PATRICIA KEEFE
CW STAFF

MOUNTAIN VIEW, Calif. — After two years on the block, Sytek, Inc., the last independent among the big three in general-purpose networking, finally landed a buyer last week — Hughes Aircraft Co., a unit of GM Hughes Electronics.

Terms of the agreement, which are expected to be completed in 60 days, were not disclosed. Sytek's largest investor, General Instruments Corp., traded its 57% interest in the privately held firm for about $50 million. Sytek's total value is estimated at between $87.7 million and $100 million.

"It was the last of the beachfront property," observed Harry K. Rosenthal, a vice-president and analyst at Deutsche Bank Capital Corp. "Who else was left?"

Sytek's two primary competitors were Bridge Communications, Inc., which was purchased in September 1987 by 3Com Corp., and Ungermann-Bass, Inc., which was acquired by Tandem Corp. last June.

Sytek — a provider of local-area and terminal-to-host networks — becomes Hughes LAN Systems (HLS), a subsidiary of Hughes Aircraft Co., on April 28. Hughes provides wide-area and satellite communications [CW, March 6].

The combined forces will target enterprisewide networks supporting voice, data and image in government and commercial accounts, a market they estimate will reach $10 billion within five years.

The merger will enable Sytek to stretch its wings over geographically dispersed networks, while providing Hughes with the opportunity both to plumb its accounts down to the desktop and to expand its reach into the corporate market.

Hughes parent General Motors Corp. also owns Electronic Data Systems Corp. "I hope EDS will become one of [Sytek-Hughes] biggest customers," said Jack Shaw, chairman and chief executive officer at Hughes Network Systems.

Initially, HLS will work with two other Hughes divisions, Hughes Aircraft and Hughes Network Systems. Interoperability and single-source management of their combined equipment base is a top priority. The merged entity is already soliciting business from a Fortune 20 company based on the combined technology.

Hughes is concentrated mostly in the government sector. "With the new administration, the defense budget . . . may not grow as fast and may even shrink," Shaw said — hence the company's interest in the corporate market.

By most observers' reckonings, Sytek has spent the last two years in retrenchment mode. At one point, Sytek was riding high as the codeveloper of IBM's PC Network. In 1986, that contract represented 49% of Sytek's revenue. Then the bottom fell out: Poor PC Network sales led IBM to abruptly cancel the OEM deal. Demand also softened in Sytek's traditional market, terminal-to-host links. Layoffs followed. Since fiscal 1987, Sytek has devoted itself to restructuring and diversifying the firm in an effort to land a buyer.

Margolis

CONTINUED FROM PAGE 115

dors should suffer few truth-in-advertising woes. The company that announces, say, a parallel processing workstation capable of kicking out 20 millions of instructions per second (MIPS) is vulnerable on multiple bases. There are wise-acres and bigmouths hanging around the computer industry who claim to know parallel processors when they see them. There are those who have ways of measuring MIPS. Just about the only safe word in the whole misbegotten product description is "Workstation;" exactly what that means is still being debated. But even Workstation lacks the elegant unassailability of "Solution." Who can say that a company claiming to offer a Solution, isn't? Quite possibly, the only safer route would be for a company to hold itself out as a purveyor of "Stuff."

And it gets better. The booming Solutions industry has gained a powerful advocate in the person of Mr. Webster, of dictionary fame. According to *Webster's* — brace yourself, here comes a shocker — *not enough companies are in the Solutions business.* The dictionary defines solution as "an answer to a problem." This is no doubt what the current crop of defectors from the computer industry had in mind.

But there's more. *Webster's* says that "solution" also means "the condition of being dissolved." Could there be a better way for firms about to merge, get acquired or file under Chapter 11 to announce their arrival as Solutions vendors?

The goodies keep coming. "Solution," the dictionary says, also means "a bringing or coming to an end or into a state of discontinuity." Anybody out there phasing out a product line? Don't apologize to your customers; get out a release and boast. You're in Solutions now.

And, should anyone question your right to be, don't throw away those announcements; store them for recycling in a year or two. Even Badness is coming around again — unless he angers his probation officer.

Margolis is *Computerworld's* senior editor, computer industry.

HDTV

CONTINUED FROM PAGE 115

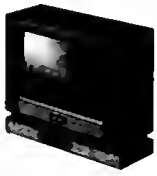
preserve, the ramifications for the U.S. computer industry will be dire, Cohen said.

"If other guys make it faster, better and cheaper than you do," he said, "there's a very little chance that customers are going to buy yours."

Similarly, he said, HDTV is predominantly a display technology. Right now, it only makes sense with giant, unwieldy screens.

However, Cohen added, "the whole promise of this technology is the compact, flat-panel display. If they start making screens like that, forget the computer screen. It's through."

Griffith Resor is the president of MRS Technology, Inc., which makes production equipment for flat-panel LCDs. Resor's company is based in Chelmsford, Mass. His clients are based in Japan.



If the U.S. defaults in HDTV, Resor said, "my personal opinion is that it's not going to be harmful to the U.S. computer industry; it's going to be fatal." He foresees an "order of defeat" that begins with laptops, progresses through workstations and personal computers, works its way through network servers and conceivably ends up with mainframes.

The scenario is not unrealistic, according to Cohen. The U.S. computer industry, he said, "is standing right smack in the middle of the track, and the bullet train is coming."

Even if the future of the domestic computer industry does not hang in the balance, Curran said, HDTV is a serious development that MIS should not dare to ignore.

"HDTV could — and probably will — change the entire nature of broadcasting, which, in turn, will change the face of communications," he said. "Communications is an integral part of how we do everything we do. If we're not interested in that, we darn well ought to be."

In addition, Curran said, international competition for HDTV turf is likely to involve the evolution of competing standards for the likes of bandwidth and broadcasting frequencies. "If MIS directors don't pay attention to the development of such standards," Curran noted, "the result will be a lot of difficulty and expense."

Offering an analogy, Curran pointed to the costs incurred by MIS establishments that opted for beta-test versions of the videocassette recorder only to find very high frequency, or VHS, the emergent standard.

Whatever else, Curran said, "MIS has to take an interest in HDTV because we have to learn what is at stake. I don't think we really know."

Zenith, AT&T in HDTV bid

Even as Congress is considering what, if any, role the federal government should play in attempting to erect and defend a U.S. stronghold in HDTV, U.S.-based private industry and government dollars are teaming up to make initial forays into the market that many industry observers consider indispensable to the continued growth of the U.S. computer industry.

The latest assault on the HDTV citadel comes from the pairing of the U.S.' lone force in the worldwide television market with its premier communications company.

Zenith Electronics Corp. and AT&T are asking the U.S. Defense Advanced Research Projects Agency (DARPA) to fund $13 million worth of a $24 million joint research and development project aimed at creating an HDTV processor/receiver, integrated circuitry and prototype hardwire for a Zenith-designed HDTV transmission system.

In a separate proposal, Zenith is seeking $10 million from DARPA to co-fund a $21.5 million effort to develop large-screen versions of the company's flat tension-mask high-resolution color picture tubes.

According to Zenith President Jerry Pearlman, the projects could combine to produce homegrown technology "that will allow the U.S. to leapfrog the Japanese and Europeans in HDTV."

Getting DARPA as a pocket partner, however, is far from a sure thing for Zenith and AT&T. Eighty-two companies are vying for shares of the $30 million that the agency recently set aside to aid in research leading to the development of HDTV products or manufacturing technology, according to a DARPA spokesman. Grants are due to be awarded next month.

One of the hopefuls, Japan's Sony Corp., recently put in a bid for a share of the DARPA fund. Federal procurement rules mandate open bidding; therefore, foreign companies are eligible for grants from the fund created to bolster U.S. competitiveness in HDTV.

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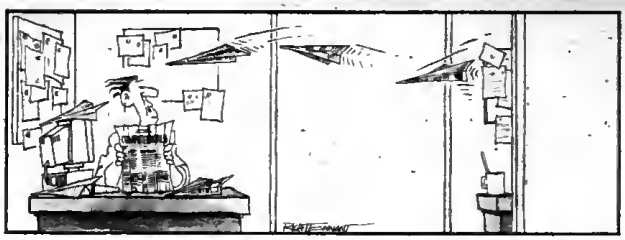

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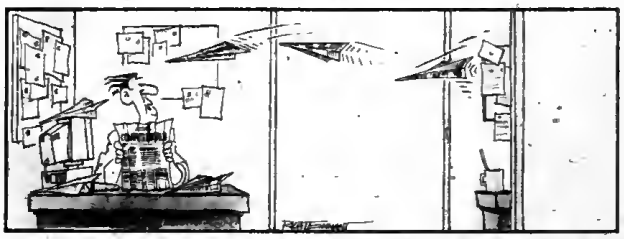

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COMPUTER CAREERS

Wall Street settles down

It's more stable than many believe but not a showcase for new technology

BY JANET MASON
SPECIAL TO CW

Current images of information systems careers on Wall Street often reflect one of two stereotypes: financial instability or a glamorous environment of leading-edge technology. However, people working on the Street tend to portray both notions as overblown.

Wall Street is not an island of instability, says Gene Bedell, managing director and manager of information services at First Boston Corp. in New York.

Aside from a six- to nine-month downturn after the stock market crash 17 months ago, there has been a healthy demand for IS professionals, Bedell says.

Steve Young, manager of technical search at recruiter Pencom Systems, Inc. in New York, concurs. "There has been some shuffling since the crash, but I would say the changes have been more or less cosmetic, with one firm laying off 50 IS people and others hiring them," he says.

He estimates that there are the same number of programmers and analysts as before the crash, although "there may have been some streamlining in the upper tiers of middle management."

Roger O'Connor, staff consultant at New York-based compensation consultancy Edward Perlin & Associates, Inc., sees layoff concerns ebbing as investment banks and brokerage houses boost their hiring of IS employees with the return of stock market stability.

After the crash, many lower level IS employees did tend to stay put, he acknowledges. "They were anxious about leaving their jobs and going to a firm that might have cutbacks," Perlin & Associates says.

While Wall Street firms have been putting expert systems and supercomputers to work, managers and recruiters see more growth in practical areas such as networks.

"Expert systems were in vogue for a while, and then they petered out," Bedell says. "There are only a few isolated companies successfully using expert systems."

The bottom line

Technologies that reap bottom-line results, such as networks and computer-aided software engineering (CASE) tools, are far more important because the payoffs are larger, Bedell says.

When job candidates know a technology such as CASE or connectivity, it's a bonus, he adds. However, he would hire people without those skills.

"We're starting to look for an understanding of CASE in our job candidates, but we will train people in an in-house CASE program that we have," Bedell says.

> "A NEW EMPLOYEE doesn't have to walk into the firm knowing about new technologies. But Wall Street firms do look for degrees from top-tier schools and polished interpersonal skills."
>
> STEVE YOUNG
> PENCOM SYSTEMS

Making inroads

Unix workstations such as those from Sun Microsystems, Inc. are one new technology making inroads in the front offices of securities organizations. Designed originally for high-speed work by engineers, the workstations are replacing high-end personal computers for statistical analyses.

The workstation applications are written in C, fueling the demand for C programmers, Young says. "It's frequently difficult to find C programmers because most MIS people have been programming in Cobol," he says. "While there will always be a need for Cobol application development, there's much more growth in C, Unix and other advanced technologies."

However, educational background and interpersonal skills weigh more heavily than technical skills in hiring, according to Young.

"A new employee doesn't have to walk into the company knowing about new technologies. But Wall Street companies do look for degrees from top-tier schools and polished interpersonal skills."

There are some differences between the hiring practices of brokerage houses and investment houses.

According to O'Connor, investment banks tend to be more aggressive about school selection and will pay starting salaries ranging from $30,000 to $33,000. Brokerage houses are not as selective and pay starting salaries in the $28,000 to $30,000 range.

Strong interpersonal skills are necessary because the information system professional interfaces with everyone in the organization, from word processing operators to "temperamental" traders who, Young says, "may regard IS people with less than high esteem."

The back office is a less visible realm of IS in the securities industry, where conventional technology is more predominant.

Mark Mosely, manager of human resources applications development at Shearson Lehman Hutton, Inc., says that experience in human resources systems and applications weighs more heavily than financial experience when he hires.

Background can vary

"It doesn't matter what industry a person comes from," he says. "It's far more important for the person to have the appropriate technical skills."

Mosely says that in his department, like similar organizations in other industries, a programmer analyst might earn between $30,000 and $35,000 per year, a business analyst approximately $45,000 and a manager $55,000.

While IS people are in demand in the back offices, they will find more advancement and better rewards in front office applications, according to Mosely.

"This is where the making of money takes place," he says.

Mason is a Philadelphia-based freelance journalist.

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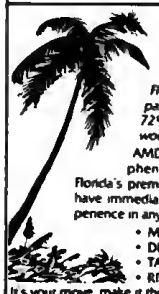

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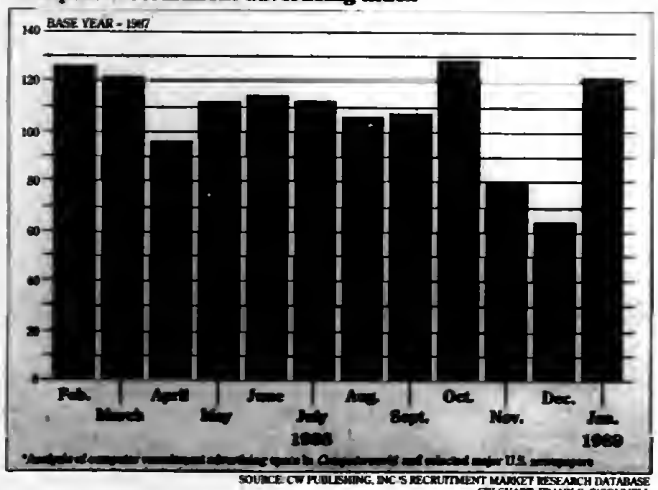
CAREER INDEX

Computer recruitment advertising index*



*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

SOURCE: CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATABASE
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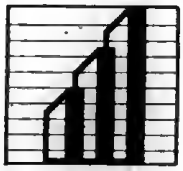

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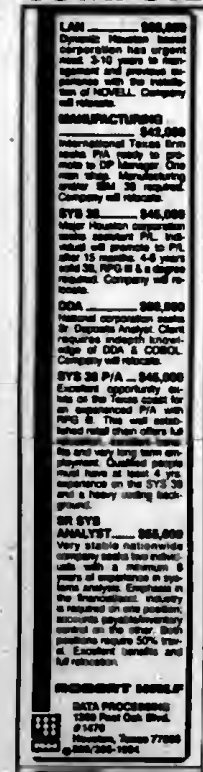
FAX [illegible] PHONE [illegible]



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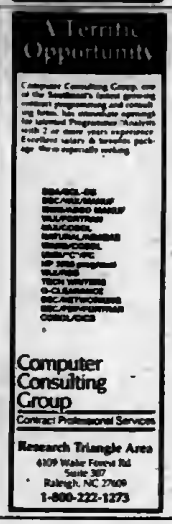

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The following information will help you determine the size ad you'd like to run and when you'd like to run it.

CLOSING DATES: To reserve space, you need to call us by 5PM (all continental U.S. time zones), 6 days prior to the Monday issue date. We need your ad materials (camera-ready mechanical or copy for pub-set ad) by 5PM, 5 days prior to the weekly issue.

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LOGOS AND SPECIAL ARTWORK: Any logos or special artwork should be enclosed with your ad copy. For best reproduction, please send us either a stat of your logo or a clean sample on white bond paper.

COLUMN WIDTHS AND MINIMUM DEPTHS: Your ad can be one of seven different widths. There is a minimum depth requirement for each width. You can also run larger ads in half-inch increments. The chart below can serve as a reference.

NUMBER OF COLUMNS	WIDTH	MINIMUM DEPTH
1 column	1-1/4"	2"
2 columns	2-5/8"	2"
3 columns	4-1/16"	3"
4 columns	5-9/16"	4"
5 columns	6-15/16"	5"
6 columns	8-3/8"	6"
7 columns	9-3/4"	7"

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The minimum ad size is two column inches (1-1/4" wide by 2" deep) and costs $378.00 if run nationally. A sample of this size appears below. You can run larger ads in half-inch increments at $94.50 per half inch. Box numbers are available and cost $25 per insertion ($50 if foreign).

Programmer Analyst

This is a sample ad for Computerworld's Computer Careers section. It will help you decide what size ad you'd like to run. Remember that you can run your ad either regionally or nationally in our recruitment section and that the minimum ad size is one column (1-4/16 inches wide) by two inches deep (like this sample). This ad would cost $378.00 in our national edition, $252.00 in the Eastern, Midwestern, or Western edition, and $324.80 in two regions. volume discounts apply.

SAMPLE AD SIZES AND PRICES: To assist you in planning your recruitment advertising, the following shows common ad sizes and their respective costs.

	One Region (East, Midwest or West)	*Two Regions (East/West East/Midwest, Midwest/West)*	*National Edition*
1 column x 2"	$ 252.00	$ 324.80	$ 378.00
2 columns x 2"	$ 504.00	$ 649.60	$ 756.00
3 columns x 3"	$1,134.00	$1,461.60	$1,701.00
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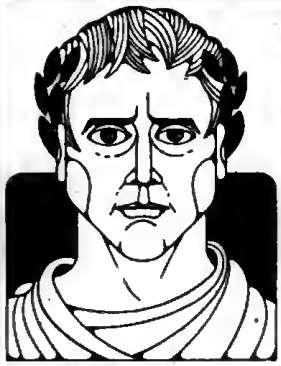

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Applicants must have a bachelor's degree and five years experience in a responsible staff capacity, in the design and implementation of the data processing or management information systems and procedures. This experience must have included documentation, the establishment of internal controls and verification that the systems are appropriate to management requirements.

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SYSTEMS ANALYST - Provide systems development & maintenance & debugging in a consultancy environment. Require Bachelor of Science or equivalent (9 months experience = 1 year education) in Data Processing or Computer Science and 3 years experience including CICS (Command & Macro Level IMS DB/DC, ASSEMBLER, VSAM, ISAM), Memory Dump analysis skills and ROSCOE. Job Location: Calabasas, CA. Salary $38,000 per annum. Resume to: 6319 DeSoto Avenue, Ste. #406, Woodland Hills, CA 91367. Attn: Karen.

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Contact:
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Please send your resume to Barbara C. Rucker, Department CW84, Storage Technology Corporation, 2270 South 88th Street, Louisville, Colorado 80028-3159. We are an equal opportunity employer.

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BOSTON: Nancy Percival, 800-343-6474. (in Mass. 508-879-0700)

NEW YORK: Warren Kolber, 201-967-1350; Jay Novack, 800-343-6474.

WASHINGTON, D.C.: Katie Kress, 703-573-4115; Pauline Smith, 800-343-6474.

CHICAGO: Patricia Powers, 312-827-4433; Ellen Casey, 800-343-6474.

LOS ANGELES: Barbara Murphy, 714-250-0164; Chris Glenn, 800-343-6474.

SAN FRANCISCO: Barbara Murphy, 714-250-0164; Chris Glenn, 800-343-6474.

MARKETPLACE

DASD rumor crimps used supply

Disk drive buyers opt for old models while awaiting IBM introduction

BY ROBERT J. CALLERY
IDC FINANCIAL SERVICES CORP.

Speculation about a February high-end disk drive announcement from IBM caused purchases and orders of new and used drives to slow considerably during the past few weeks.

Several industry sources have reported imminent announcement of a "3390," the unofficial name of the IBM 3380 replacement. As a result, many IBM customers considering acquisition of direct access storage devices (DASD) decided to defer their plans until after the rumored announcement. Specifically, customers planning to dispose of 5G-byte 3380 Es in favor of 7.5G-byte 3380 Ks did not follow through and held onto their installed 3380 Es.

Also, some customers, fearful of being the last one on the block to buy 3380 Ks before they are replaced, decided to buy used 3380 Es instead. These two factors — customers postponing plans to replace 3380 Es with 3380 Ks and substituting purchases of 3380 Es for acquisitions of 3380 Ks — have caused the supply of used 3380 Es to become extremely tight. Consequently, their prices have risen.

Although IBM did make an announcement on Feb. 7, it did not include the widely anticipated 3390. IDC Financial Services Corp. said IBM will announce the 3390 in June 1989. IBM did announce price cuts on its new 3990 Model 3 cache controller, a promotional offering for 3380 DASD and 3480 tape customers, a new low-end 3090 processor and an additional model for the aging 4381.

Before the Feb. 7 announcement, the supply of 3380 Es was already tight because of uncertainty with the immediate future of the 3380. After the announcement, the supply of 3380 Es became even tighter because customers who delayed DASD acquisitions released an onslaught of pent-up demand. As a result, we are seeing tight supply and increasing demand.

This combination has caused the price of used 3380 AEs to rise approximately 7% since the beginning of the year and prices of used 3380 BEs to rise about 13%. Even prices of the 2.5G-byte 3380 AD4 and BD4 have increased during the past few weeks as users look to acquire cheap gigabytes. These drives in particular experienced a dramatic loss in value over the past several months as customers replaced them en masse with 3380 Es, Js and Ks.

If prices of 3380 Es continue to rise, customers will be more inclined to purchase used 3380 Ks when they become available. Also, it appears that IBM is willing to negotiate discounts on new 3380 Ks, which would have been difficult to obtain last quarter. This means that even the price of new 3380 Ks is becoming more attractive. This comparison does not even consider the better performance gained when using four-pathed 3380 Ks with 3990s compared with dual-pathed 3380 Es coupled with older 3880s.

These developments suggest that prices of used 3380 Es cannot go much higher and still make economic sense. Yet, economic realities do not always drive the marketplace. If demand for 3380 Es continues to increase while supply remains tight, prices of 3380 Es will maintain their current upward trend.

In the near term, we are likely to see two powerful forces working against each other. The first is generated by customers who are nervous about adding 3380 Ks to their DASD portfolios in light of replacement rumors. They will, instead, opt for used 3380 Es. This will keep 3380 E demand high, causing limited supply and rising prices. The second force is the simple dollars-and-cents aspect of getting one's money's worth when comparing the price of used 3380 Es with that of used or discounted new 3380 Ks.

For the used 3380 E market to return to normal conditions, the supply must obviously increase. If a few large data centers replace Es with 3380 Ks, supply will increase and relieve some of the high demand. This scenario is unlikely, though, with rumors of an impending 3390 announcement. But stranger things have happened.

For more information, contact IDC Financial Services' Terri LeBlanc at 508-872-8200.

IBM disk drive

Current fair market value

Model	Date shipped	List price	Storage capacity (in Gigabytes)	Retail percent of list price
3380 AA4	4Q '81	$88,780	2.5	4%
3380 B4	4Q '81	$64,440	2.5	4%
3380 AD4	1Q '85	$86,100	2.5	15%
3380 BD4	1Q '85	$61,950	2.5	14%
3380 AE4	3Q '85	$118,650	5.0	47%
3380 BE4	3Q '85	$94,500	5.0	52%
3380 AJ4	4Q '87	$86,100	2.5	New
3380 BJ4	4Q '87	$61,950	2.5	New
3380 AK4	4Q '87	$134,400	7.5	New
3380 BK4	4Q '87	$110,250	7.5	New

SOURCE: IDC FINANCIAL SERVICES CORP.
CW CHART

Index

The BoCoEx index on used computers

Closing prices report for the week ending March 3, 1989

	Closing price	Recent high	Recent low
IBM PC Model 076	$625	$750	$350
XT Model 086	$1,000	$1,150	$900
XT Model 089	$1,200	$1,575	$1,000
AT Model 099	$1,725	$2,000	$1,525
AT Model 239	$1,875	$2,100	$1,800
AT Model 339	$2,100	$2,375	$1,800
PS/2 Model 30	$1,375	$1,550	$1,000
PS/2 Model 50	$2,200	$2,400	$1,900
Compaq Portable I	$650	$750	$550
Portable II	$1,900	$2,100	$1,750
Portable III	$2,800	$2,950	$2,500
Portable 286	$1,750	$1,975	$1,675
Plus	$1,050	$1,250	$900
Deskpro 286	$2,100	$2,350	$1,800
Deskpro 386	$3,750	$3,975	$3,675
Apple Macintosh 512	$700	$775	$550
512E	$775	$975	$600
Plus	$1,025	$1,225	$1,000
II	$4,200	$4,450	$3,800
Toshiba T3200	$2,800	$3,000	$2,500
Zenith 183	$1,400	$1,500	$1,000

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

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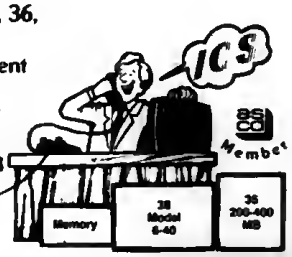

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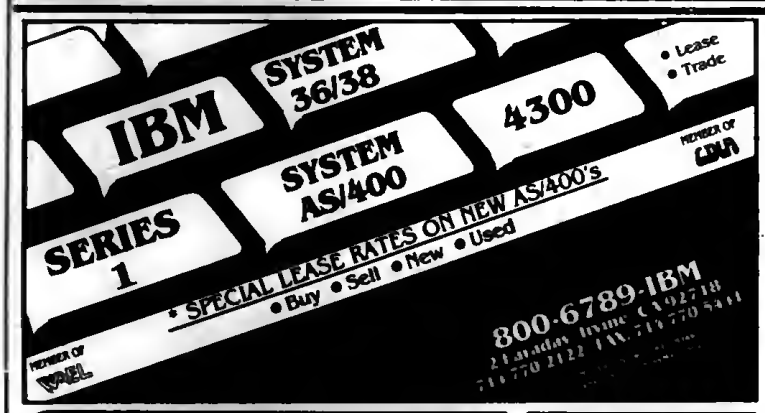

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A Proposers' Conference will be held at FISA at 10:00 A.M. on March 22, 1989. The deadline for receipt of proposals is 10:00 A.M. on April 7, 1989. Proposals will be submitted to the Office of the Comptroller. Further details will be found within the Request for Proposals.

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Evaluating CBT software

Check out these characteristics when buying training packages

BY MARK DUNCAN
SPECIAL TO CW

A sagacious training coordinator once said of computer-based training (CBT) software, "When you have a good product, you will know it."

She is right: Prolonged research to satisfy students' needs cultivates a unique intuition — a sixth sense, if you will — when it comes to evaluating training software. But acquiring that intuition, and using it comfortably and reliably, takes time.

For the person who is new to the process, the following suggestions may help.

• Audience fit. Naturally, one CBT course will not perfectly match every student in an audience. But a course that is structured with multiple entry levels — basic, intermediate and advanced — will obviously be more successful.

Along with providing entry points for differing skill levels, this type of course offers the opportunity for repeated sittings as a student progresses from one skill level to the next.

• Versatility. Most large data processing organizations are becoming multivendor environments. Because the student audience may well be spread across these multiple hardware and software platforms, it is important that the CBT software be versatile enough to accommodate them. A centralized training system eliminates this problem. However, one of the attractive features of CBT is that it is self-paced and can be conducted in an individual's office entirely at his convenience.

• Currency and topicality. One of the biggest dangers facing all training material, CBT or otherwise, is that it becomes outdated so quickly — often within a year — that it offers little or no practical value. For leased software, it is common for vendors to offer regular updates. Companies that purchase training software must make a judgment on the longevity it offers. In some cases, teaching out-of-date practices may be worse than teaching none at all.

• Product testimonials. In evaluating CBT, one is wise not to ignore the experience and opinion of others who have already used a particular vendor or course. The primary source of these testimonials is other user organizations. Trainers from these organizations are generally more than willing to share their opinions, good and bad, on particular products.

Vendors will gladly provide a list of references on demand. But since they will obviously only list names of clients who favor their products, it makes sense to supplement this list with one's own business acquaintances.

Other sources for product reviews are the trade journals and local trainers' and educators' groups.

ONE OF THE BIGGEST dangers facing all training material, CBT or otherwise, is that it becomes outdated so quickly — often within a year — that it offers little or no practical value.

• Curriculum fit. It is important that training software "fit" any existing training curriculum. Most organizations offer an MIS career path. An employee progresses along this path by acquiring and demonstrating the skills for a particular position, usually for the one above his current position. To make career advancement manageable, organizations define not only the necessary skills but a matching curriculum as well.

CBT software must fit this curriculum. One vendor may be able to satisfy your entire curriculum needs, but more commonly, training requires the services of more than one vendor. So the critical concern becomes not only how well a product will fit your curriculum but how well it will integrate with other training material within the curriculum.

• Customization. No single software training package will fit all environments, so it is necessary for the software to be customizable. Unique features can be the host hardware, software and even the terminals on individual students' desks.

Customization is desirable in another context: the course content itself. Even within a department, two students may require the same course but different parts of it. Or they may prefer to select course modules in different sequences, requiring customization at the student level. Another customizing feature may enable a self-paced course to be modified for classroom or group presentation.

• Interactive characteristics. Not surprisingly — and cliched as it may sound — CBT must be "friendly." It must instill in the student the feeling that he is in charge, that he is doing the driving, and that he apparently chooses the direction in which to proceed. Removing choice in an interaction between student and machine will in part remove some of the challenge, motivation and determination to continue.

• Continuity. The idea behind self-paced training is that the student can start, stop and resume training at his convenience. Therefore, the software should provide opportunities for review of previous topics or simple quizzes to quickly reorient the student within the course.

• Tolerance. Lastly, it is desirable that the software is tolerant and forgiving. Students will undoubtedly make mistakes, but they must be corrected in such a way that learning continues to be an enjoyable experience and not a punishing one.

Obviously, the surest way of getting training software that exactly fits your need is to develop it yourself. Authoring systems abound for that very purpose. But it would be impractical not to consider the offerings of training vendors first, especially if they offer a mature product that has been refined over many years.

The wise training coordinator who said, "When you have a good product, you will know it," might have concluded that, "If you don't know it, your students will certainly let you know otherwise!"

Duncan is a quality assurance consultant at a large Dallas bank.

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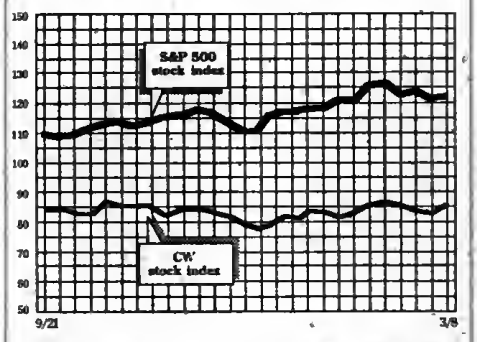

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Computer Systems	95.7	95.8
Software & DP Services	111.0	114.0
Semiconductors	55.1	54.6
Peripherals & Subsystems	77.8	79.7
Leasing Companies	91.8	100.6
Composite Index	83.0	85.2
S&P 500 Index	121.8	123.9

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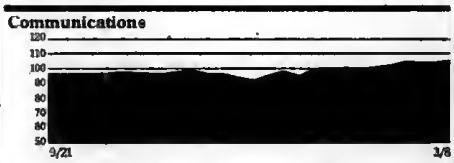

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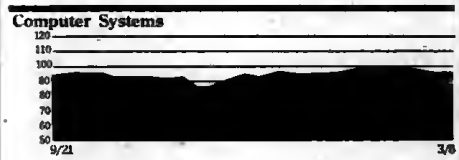

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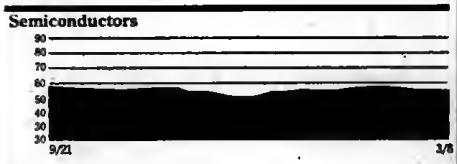

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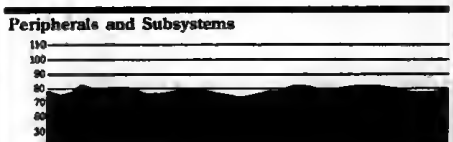

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		PRICE 52-WEEK RANGE (1)	CLOSE MARCH 8, 1989	WEEK NET CHNGE	WEEK PCT CHNGE

Communications and Network Services

N	AMERICAN INFO TECHS CORP	53	42	51.125	0.4	0.7
Q	ANDREW CORP	22	18	20	-0.3	-1.2
Q	ANTEL COMM CORP	4	1	2.688	-0.1	-2.3
N	AT&T	33	24	30.6	0.5	1.7
Q	AVANT GARDE COMP INC	1	0	0.063	0.0	0.0
Q	AVANTEK INC	8	4	5	-0.1	-2.4
N	AYDIN CORP	17	13	15.625	0.0	0.0
N	BELL ATLANTIC CORP	75	64	74.25	1.5	2.2
N	BELLSOUTH CORP	44	37	41.75	1.0	3.1
Q	COMPRESSION LABS INC	9	3	4.75	1.1	61.0
Q	COMPUTER NETWORK TECH	6	1	1.532	0.1	4.3
Q	CONTEL CORP	61	61	49.75	2.5	8.1
Q	DATA SWITCH CORP	10	9	9.25	0.3	9.0
Q	DIGITAL COMM ASSOC	26	17	22.375	-0.1	-0.6
Q	DYNATECH CORP	24	17	18.5	-0.3	-1.3
Q	FIBRONICS INTERNATIONAL INC	0	0	0	0.4	9.1
Q	GANDALF TECHNOLOGIES	6	5	4.625	-0.4	-7.8
Q	GENERAL DATACOMM INDS	6	3	5.5	-0.4	-6.4
N	GTE CORP	47	34	46.125	1.4	3.1
Q	INFOTRON SYS CORP	14	9	10.3	-0.3	-2.3
N	ITT CORP	56	44	52.75	0.1	0.8
N	M/A-COM INC	11	8	7.375	0.0	0.0
Q	MCI COMMUNICATIONS CORP	57	11	26.5	1.8	8.9
Q	NETWORK EQUIPMENT TECH INC	23	14	21.5	1.8	9.0
Q	NETWORK SYS CORP	12	8	9	0.0	0.0
N	NORTHERN TELECOM LTD	30	19	19.5	0.1	0.8
Q	NOVELL INC	36	19	33.75	-2.1	-5.9
N	NYNEX CORP	71	61	70.25	2.4	2.5
N	PACIFIC TELESIS GROUP	39	27	28	1.4	5.1
A	PENRIL CORP	6	4	4.9	-0.1	-2.7
N	PLESSEY PLC	45	25	44.438	0.4	1.0
N	SCIENTIFIC ATLANTA INC	16	10	14.125	-0.1	-0.5
N	SOUTHWESTERN BELL CORP	49	34	48.375	1.0	2.1
Q	U S COMM CORP	28	16	26.375	-1.4	-5.0
N	U S WEST INC	33	50	62	2.5	8.8

Computer Systems

Q	ALLIANT COMPUTER SYS	9	6	3.625	0.5	16.0
Q	ALPHA MICROSYSTEMS	6	4	7	0.5	7.7
Q	ALTOS COMPUTER SYS	15	7	7.625	0.1	1.7
A	AMDAHL CORP	26	16	17.75	-0.5	-4.7
Q	APOLLO COMPUTER INC	17	7	7.75	-0.5	-5.8
N	APPLE COMPUTER INC	49	34	36.25	-0.5	-1.3
N	BOLT BERANEK & NEWMAN	16	9	10	0.5	5.3
Q	BRITTON LEE INC	4	3	3.625	-0.5	-7.5
N	COMPAQ COMPUTER CORP	75	47	67.125	0.4	0.6
Q	COMPUTER AUTOMATION INC	14	3	3	0.1	2.6
Q	CONCURRENT COMP CORP	8	4	4.375	-0.5	-10.9
N	CONTROL DATA CORP	25	16	22	0.6	2.6
Q	CONVEX COMPUTER CORP	11	7	11	-0.1	-1.1
N	CRAY RESH INC	89	53	57.75	-2.5	-3.9
Q	DAISY SYS CORP	12	9	9	0.0	0.0
N	DATA GEN CORP	27	17	17.5	-0.5	-3.4
N	DATAPOINT CORP	9	4	3.75	-0.1	-3.2
Q	DELL COMPUTER CORP	13	7	8.875	-0.3	-3.5
N	DIGITAL EQUIP CORP	122	86	113.25	3.3	3.0
N	FLOATING POINT SYS INC	6	2	2.875	-0.1	-4.2
N	HARRIS CORP	33	25	27.375	-0.4	-1.4
N	HEWLETT PACKARD CO	39	44	55.5	0.3	1.4
N	HONEYWELL INC	77	57	63.75	0.5	1.4
N	IBM	131	104	119.625	-0.3	-0.2
Q	INFORMATION INTL INC	16	12	16.25	0.9	9.6
Q	IPL SYS INC	2	1	1.25	0.3	4.3
N	MAI BASIC FOUR INC	11	7	8.125	-0.5	-6.0
N	MATSUSHITA ELEC INDL LTD	230	136	165.125	-3.9	-2.1
Q	MEGADATA CORP	4	1	1.563	0.1	4.2
Q	MENTOR GRAPHICS CORP	37	23	34.5	2.3	7.0
N	MIN INC	7	1	1.625	-0.1	-7.1
N	NCR CORP	75	51	57.5	-2.1	-3.5
N	PRIME COMPUTER INC	21	12	18.625	-0.3	-1.3
Q	PYRAMID TECHNOLOGY	16	10	14.25	1.0	8.8
Q	SILICON GRAPHICS CORP	25	14	16.5	0.1	0.6
Q	STRATUS COMPUTER	32	61	25	0.0	0.0
Q	SUN MICROSYSTEM INC	61	15	16.9	-1.2	-7.0
Q	SYMBOLICS INC	6	1	2	0.8	14.3
Q	SEQUENT COMPUTER SYS INC	29	14	24.125	1.4	9.0
N	TANDEM COMPUTERS INC	62	13	19	-0.1	-0.7
N	TANDY CORP	46	38	43.5	0.5	1.5
N	ULTIMATE CORP	16	6	10.375	-0.3	-2.4
N	UNISYS CORP	38	25	38.125	-0.8	-2.5
A	WANG LABS INC	17	9	9.375	0.0	0.0

Software & DP Services

Q	ADVANCED COMP TECH	4	1	3.125	0.0	0.7
Q	AMERICAN MGMT SYS INC	16	10	10.125	-1.1	-9.8
Q	AMERICAN SOFTWARE INC	61	16	20.125	2.5	11.0
N	ANACOMP INC	12	5	9.625	0.4	7.1
Q	ANALYSTS INTL CORP	12	7	10	1.5	8.1
Q	ASHTON TATE	61	20	20	-1.5	-7.0
Q	ASK COMPUTER SYS INC	15	13	16.75	1.5	9.8
Q	AUTODESK INC	34	22	29.5	0.5	1.7
N	AUTO DATA PROCESSING	47	35	38.5	-0.5	-1.7
Q	BMC SOFTWARE INC	17	8	17.125	1.8	11.4
Q	BOOLE & BABBAGE INC	10	6	14.75	0.5	2.5
N	BUSINESSLAND INC	16	9	11.5	-1.1	-8.8
N	COMPUTER ASSOC INTL INC	40	24	38.5	1.5	5.0
N	COMPUTER HORIZONS CORP	12	7	8.375	0.0	0.0
N	COMPUTER SCIENCES CORP	55	38	51.875	1.5	3.0
Q	CORPORATE SOFTWARE	16	6	10	-0.5	-4.8
N	COMPUTER TASK GROUP INC	17	10	13.625	0.4	2.8
Q	COSMOS INC	9	6	7.75	0.8	13.7
Q	COMSHARE INC	36	15	27.375	2.5	11.7
N	CULLINET SOFTWARE INC	6	4	5.25	-0.1	-2.3
Q	DUQUESNE SYS INC	34	16	23.75	0.5	2.5
N	GENERAL MTRS (CLS E)	47	57	43.625	0.1	0.5
Q	HOGAN SYS INC	8	6	6.125	0.8	13.9
Q	INFORMIX CORP	25	7	11	0.5	5.0
Q	INTELLICORP INC	4	3	3.75	0.1	3.4
Q	KEANE INC	37	6	26.5	0.5	2.0
Q	LOTUS DEV CORP	33	15	21	0.0	0.0
Q	MANAGEMENT SCI AMER	14	6	7.875	-0.4	-4.5
Q	MICRO PRO INTL CORP	4	3	3.938	0.0	0.0
Q	MICROSOFT CORP	71	48	52.5	-4.5	-11.4
Q	MORINO ASSOCIATES INC	20	12	19.5	0.0	0.0
Q	NATIONAL DATA CORP	32	16	25.375	0.5	2.5
N	ON LINE SOFTWARE INTL INC	14	4	6.5	0.4	7.3
Q	ORACLE SYS CORP	29	16	28	2.5	11.7
Q	PANSOPHIC SYS INC	16	12	16	0.6	4.3
Q	PHOENIX TECHNOLOGIES INC	16	12	17.75	0.1	0.7
Q	POLICY MGMT SYS CORP	27	21	23.75	0.3	0.0
Q	PROGRAMMING & SYS INC	15	10	17.5	0.0	0.0
Q	RAMSET SOFTWARE INC	5	5	2.375	-0.6	-6.6
Q	RELATIONAL TECHNOLOGY INC	21	12	16.75	1.8	12.6
N	REYNOLDS & REYNOLDS CO	23	17	20	1.5	8.7
Q	SEI CORP	22	16	16.375	0.1	0.8
Q	SHARED MED SYS CORP	25	14	16.125	0.9	2.6
Q	SAGE SOFTWARE INC	10	5	8.375	0.6	8.7
Q	SOFTWARE PUBG CORP	27	13	16.25	-0.5	-3.0
A	STERLING SOFTWARE INC	6	5	6.75	0.9	2.6
Q	SUNGARD DATA SYS INC	25	14	19.9	0.5	2.6
N	SYSTEMATICS INC	34	26	33.5	1.0	3.1
N	SYSTEM CENTER INC	21	12	22.75	0.9	4.4
N	SYS. SOFT INC	36	6	23.125	0.5	2.8

Semiconductors

N	ADV MICRO DEVICES INC	17	7	8.25	-0.1	1.5
N	ANALOG DEVICES INC	16	10	11.375	-0.3	-2.3
Q	ANALOGIC CORP	10	6	8.625	0.5	0.0
Q	CHIPS & TECHNOLOGIES INC	61	11	14.25	-0.8	-4.4
N	INTEL CORP	37	19	28.5	0.9	2.4
Q	LSI LOGIC CORP	14	6	10.375	0.0	0.0
Q	MICRON TECHNOLOGY INC	26	16	16	-0.1	0.7
N	MOTOROLA INC	66	36	42.375	0.0	0.0
N	NATL SEMICONDUCTOR	16	9	9.125	-0.1	-1.8
N	TEXAS INSTRS INC	57	26	39.25	-0.6	-1.5
A	WESTERN DIGITAL CORP	16	11	11.75	-0.6	-5.1

Peripherals

Q	ALLOY COMP	6	6	3.125	0.1	6.3
N	AM INTL INC	6	6	5.875	-0.3	4.4
Q	AST RESH INC	17	7	7.25	0.0	0.0
Q	AUTO TROL TECH CORP	6	4	6.122	0.0	0.0
Q	BANCTEC INC	15	7	11.5	0.1	1.1
Q	CIPHER DATA PRODS INC	11	8	8.8	-0.6	-6.2
A	COGNITRONICS CORP	4	3	3.875	0.5	14.8
Q	CONNOR PERIPHERALS	10	7	7.5	-0.1	-1.5
A	DATAPRODUCTS CORP	16	6	10.625	0.1	0.8
A	DATARAM CORP	9	6	6.75	-0.3	-2.5
N	EASTMAN KODAK CO	80	39	48.375	0.5	1.0
Q	E M C CORP MASS	10	4	4.125	0.1	3.1
Q	EMULEX CORP	12	6	10.125	-0.5	-4.7
Q	EVANS & SUTHERLAND	22	10	17.75	0.5	2.6
Q	ICOT CORP	6	6	2.5	0.0	0.0
Q	INTERLEAF INC	61	6	6.125	0.5	7.4
Q	OMEGA CORP	6	6	2.188	0.0	0.0
Q	LEE DATA CORP	4	2	2.5	-0.1	-4.1
Q	MAGISTOR SYS CORP	4	3	2.938	0.0	0.0
Q	MAXTOR CORP	16	6	6.125	0.5	7.4
Q	MICROPOLIS CORP	30	6	6.375	0.0	0.3
Q	MINISCRIBE CORP	14	4	3.719	-0.4	-8.8
N	MINNESOTA MING & MFG CO	75	57	66.625	1.8	2.8
Q	PERSONAL COMPUTER PRODUCTS INC	7	4	4.063	0.1	1.5
Q	PRIAM CORP	3	1	0.938	0.0	26.3
Q	PRINTRONIX INC	11	7	7.5	0.3	3.4
N	QMS INC	10	6	6.875	0.2	0.0
Q	QUANTUM CORP	17	10	16.25	0.0	0.0
N	RECOGNITION EQUIP INC	12	6	10	0.0	0.0
Q	RENOIR INC	8	4	7.375	0.4	6.4
Q	SEAGATE TECHNOLOGY	22	7	10.75	-0.1	-1.1
N	STORAGE TECH CORP	4	1	3	0.3	14.3
Q	TANDON CORP	3	1	1.094	0.1	9.4
N	TEKTRONIX INC	30	19	22.625	0.9	4.0
Q	TELEVIDEO SYS INC	1	0	0.344	0.0	-8.3
N	XEROX CORP	67	30	63	2.8	4.6

Leasing Companies

Q	AMPLICON INC	20	13	16	-0.3	-1.9
N	CAPITAL ASSOCIATES INTER-NATIONAL INC	7	4	6.75	0.8	12.5
N	COMDISCO INC	26	16	24.125	1.1	4.9
Q	CONTINENTAL INFO SYS	1	0	0.625	0.9	42.7
Q	LDI CORPORATION	16	10	14.3	0.0	0.0
Q	PHOENIX AMERN INC	9	9	2.5	-0.8	-6.7
Q	SELECTRON INC	7	4	7	0.3	3.7

EXCHG — N = NEW YORK; A = AMEX; NQ = NATIONAL

Face the music

Microsoft, others must pay the piper for too-high projections

If anyone was whistling in the halls at Microsoft Corp. last week, the tune probably was "The Harder They Come, The Harder They Fall." Only weeks after the high-flying software company wowed analysts and customers with its 1989 preview, it had to admit that product delays would lead to lower numbers than projected. Microsoft stock, notably on the rise of late, came crashing down 10 points to close Thursday at 51¼.

Aftershock from the Microsoft news shook the company's competitors. Ashton-Tate Corp., which also announced disappointing earnings, closed at 20, down 2¼ points. Lotus Development Corp. dropped ⅛ of a point to close Thursday at 21.

Novell, Inc.'s stock fell during the week as rumors of poor earnings turned into fact. Novell closed on Thursday at 31⅛, down 3⅛ points.

The week brought better tidings to Apple Computer, Inc.: in a week that saw a new Macintosh, Apple stock reversed its recent trend and picked up a point to close at 35⅜.

IBM dropped 2⅛ points to a Thursday close of 118⅜. Digital Equipment Corp. ended Thursday at 112⅛, up ⅛ of a point.

NELL MARGOLIS

Users wary of repository move

BY ROBERT MORAN
CW STAFF

Having endured more than a year of speculation about IBM's forthcoming repository, large users are cautiously making plans for its release but are still going ahead with some of their own repository-like projects.

Metropolitan Life Insurance Co. in New York designed its own repository-style dictionary composed of relational tables that interface with IBM's DB2, said Charley Dietz, manager of data administration for pensions, savings and retail.

"The repository will be very important for Big Blue shops and especially for my department," Dietz said. "Eventually, we would like to have a homogeneous shop, including all the tools being able to talk to each other. It is our dream." While Dietz said his department will probably make the conversion, it could take five years. "We are not stopping and waiting for the repository," he said.

The same approach was taken by Bill Werbin, vice-president of wholesale information systems development at Manufacturers Hanover Trust Co. in New York. Werbin said the department has built its own dictionary and looks to bridge the dictionary later into the IBM repository.

In addition, he said, the department is working with computer-aided software engineering (CASE) tools such as Index Technology Corp.'s Excelerator and using the proprietary dictionaries associated with them. "We are assuming that IBM will define a mechanism with links to some of the CASE tools," he said. "It has said the repository will be an open architecture."

Some say yes

Mike Gruia, vice-president of systems at Chase Manhattan Bank in Garden City, N.Y., said he is attempting to standardize his data architecture "across the board" so that he will be ready for the IBM repository.

Gruia also uses Excelerator and its data dictionary. He plans to move data to IBM's repository when it is released.

Lou Lane, database administrator at Hewitt Associates in Lincolnshire, Ill., and a user of Computer Associates International, Inc.'s CA-Datacom/DB, is betting on CA's new Application Construction Environment data dictionary. "A lot of the information needed in a repository is already in the data dictionary from using CA-Datacom/DB and Ideal," she said.

It looks like the early winners in the user community will be IBM's 3090 mainframe accounts, particularly those running MVS/ESA and DB2. They will receive the first versions of the repository, according to IBM. Robert Libutti, IBM programming systems director of market support, specified MVS as an operating system for the repository but would not say whether it would run under both MVS/XA and MVS/ESA.

VM users will likely get the repository early on, he indicated, while DOS/VSE users will never get it. "VSE users are not in a heavy life cycle development mode," he said, describing the principal target user group.

Application System/400 users will get the repository later, but there is less need for them to have it because the AS/400 offers efficiency in its integrated relational database and operating system, Libutti pointed out.

Most users who were contacted by *Computerworld* said they will have to evaluate the task of conversion before committing to IBM's repository. Deitz said that the major chore will be to understand how Metropolitan Life's data modeling fits into the repository. "If IBM offers a comprehensive tool, the major chore will be to understand how to transform Metropolitan Life's understanding of the real world into another understanding of IBM's world, which would be the repository," he said.

Computerworld *senior editor Stanley Gibson contributed to this report.*

What is it?

IBM's forthcoming repository will spare corporations the burden of maintaining the numerous directories and dictionaries — and redundant data — that accumulate throughout the application's development life. The repository is a successor to IBM's data dictionary, which dates back to the late 1960s, as well as the DB2 catalog. At a finer level of detail, the repository, which will likely work with IBM's DB2 at first and other IBM SQL-based databases later, will itself be a database that contains all the specifications of dependencies and constraints as well as the enforcement of them. Among the components of the repository will be objects that describe a user company's business model.

The repository should be used throughout the computer-aided software engineering process or throughout the life cycle of development. It will be used to establish the business model when the application is first conceived. Then it will be used to design the database, screens and logic and then to generate code. Finally, its entities and relationships will continue to be used in maintaining the program after it is put into production.

Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y., said the repository will be composed of two parts: a dictionary containing informational elements, or objects, and their descriptions, and a directory that contains the location of information and how to get at it. "Through front-end tools, users will access and manipulate data from the dictionary. The system will use the directory," Atre said.

In addition, IBM will permit dictionaries and directories from third-party vendors to be treated as objects within the repository and allow them to generate applications as they do today, said Colin White, an independent consultant and editor of *InfoDB*, a database journal.

Application programming interfaces will allow the various front-end tools to gain access to information contained within the base tables, or the physical views, of the repository. However, each tool will have a peculiar, or logical, view of what is contained within the repository, and each tool will navigate through the model to find the optimum path, Atre said.

ROBERT MORAN

FBI called lax in wake of hacker nab

BY J. A. SAVAGE
CW STAFF

Inattention in pursuing a widely publicized hacking case last year is coming back to haunt the Federal Bureau of Investigation, other federal investigative agencies said last week.

The arrest of hackers by West German authorities this month [CW, March 6] for allegedly giving computer information to the Soviets includes Marcus Hess, the same man fingered in last year's penetration of more than 30 computers at U.S. research labs, military installations and defense contractors.

Six West German hackers reportedly were detained at the beginning of March following police raids of apartments in Hanover, West Berlin and Hamburg. While the FBI did not pursue the former hacking case, Hess was "caught" electronically by a civilian.

The FBI has been "embarrassed" into more actively pursuing computer crime, said Jim Christy, assistant chief of computer crime at the U.S. Air Force Office of Special Investigations in Washington, D.C. "This case is a catalyst. People are starting to understand the threat," he said.

Christy's office was assisting in investigating the older Hess case but was frustrated with the lack of attention by the U.S. Department of Justice and the FBI.

Phil Sibert, computer protection program manager at the U.S. Department of Energy, said he is not sure if the FBI was embarrassed into action, but it was certainly caught unprepared, he said.

For its part, the FBI would not even confirm it had a case open on the hackers, although both Christy and Sibert had been contacted by the FBI in the past year with information requests.

Cliff Stoll, a researcher at the Smithsonian Astrophysical Observatory at Harvard University, was the civilian who set a trap for Hess in 1987 while working in the Lawrence Berkeley Laboratory in Berkeley, Calif. During that time, Stoll said that he found evidence of intrusions by some of the same hackers nabbed in the case by West German authorities.

In addition to relating password information to the Soviet Union, Stoll said that those arrested were also passing along information on network connection techniques and hacker methodologies.

While tracking the hackers, Stoll became concerned about their political bent. In particular, Hess had been attempting to access any file with a military-sounding title. "He was looking for keywords you'd associate with someone doing espionage, like 'NORAD,' 'nuclear bomb' and 'SDI,' " Stoll said.

During that time, the U.S. Department of Energy set up measures to heighten awareness of its security and tighten it up, Sibert said. He said that whatever information was passed to the Soviets would do them little good. "A majority of those systems have been changed, and [passwords and addresses] wouldn't be of any value today," he said.

Concern grows over East Bloc espionage

BY ULF J. FROITZHEIM
IDG NEWS SERVICE

HANNOVER, West Germany — Official evaluations of this country's latest — and computerized — spy scandal differed significantly here last week, but data security experts said it pointed out the seriousness of industrial espionage by East Bloc agents.

The Minister of the Interior compared the case to the celebrated "Guilleaume" affair that forced the resignation of West German Chancellor Willy Brandt in 1974. Guilleaume was the code name of an East German agent who had penetrated the inner circle of the chancellor's advisors before being uncovered.

But a spokesman for the federal attorney general here played down the case. Television reporters familiar with the case said privately that the attorney general was refusing to push it because of a lack of sufficient evidence. Intelligence officials denied the press reports, saying the hackers had gained only superficial access to their targets and never managed to access top-secret information.

Data processing experts interviewed here, however, argued that even if no defense secrets were lost, the case is important in terms of the industrial information that has been electronically pilfered. The espionage could have cost Western firms several hundred million dollars per year for several years, they estimated, because of the loss of pirated technology.

The DP experts said that industrial espionage carried out by East Bloc agents over computer networks has become a very serious issue in Europe. Rainer von zur Muehlen, a security consultant in Bonn, said that most data networks are vulnerable because of operators' negligence on security issues. He said the East German intelligence agency has repeatedly attempted to contact West German DP specialists and that the problem of hacking was widespread.

IBM

FROM PAGE 1

Data Corp., a market research firm in Framingham, Mass. To bring the software world up to date, IBM reportedly staged a briefing recently at its Cary, N.C., facility that was attended by some 100 software vendors.

The CASE model that IBM describes, which some refer to as Application Development/SAA, is a host-based system that requires an intelligent workstation for user access. Implicit in the SAA scheme is an OS/2-based system using the IBM and Microsoft Corp. Presentation Manager graphical user interface. Several CASE vendors, including Knowledgeware, Inc. and Index Technology Corp., said they plan to implement a Presentation Manager interface for their CASE tools.

IBM intends to control the back end of the hardware, operating system, database and repository. Above that, IBM's Cross System Product (CSP) will play as one of several fourth-generation languages. Above that, a wide variety of CASE tools will work interchangeably.

"We will major in back-end tools and minor in front-end tools," Libutti said. He made clear that the repository will require an IBM SQL-based database running on the host. There is no guarantee that it will work with non-IBM SQL databases such as Oracle Corp.'s Oracle and Relational Technology, Inc.'s Ingres, Libutti said.

"When IBM says SQL, they don't mean Oracle," said one CASE vendor who is committed to working with IBM's repository strategy. IBM's SQL will be different, he said, adding, "I don't know how, but they will make it different."

Indeed, IBM appears to have been courting smaller tools vendors and avoiding those that sell tools in addition to major competing database products. Oracle and Cullinet Software, Inc., for example, both asserted they have not been working closely with IBM thus far.

Although a number of CASE players have built their own repositories, encyclopedias or equivalents, many said they have done so with one eye on the IBM repository, adding that when it is announced, they will scrap their own and move to IBM's.

"As soon as we get it, we will move our data onto their repository," Arthur Andersen's Ferguson said. "When we move our data over, we will provide tools and automation to allow an application to move to their repository." Similar statements were made by spokesmen from Sage Software, Inc., Texas Instruments, Inc. and Knowledgeware.

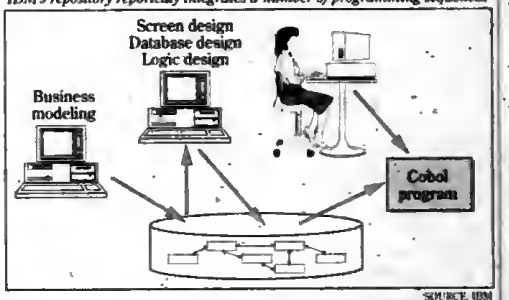
The repository project has been under development at IBM for a number of years, but the push to make it SAA-compliant has kept it from the public for the past two years, Libutti acknowledged. He claimed that the recent departure to Apple Computer, Inc. of Morris Teradalsky, who had headed repository development, did not affect the rollout schedule of the software.

Independent software vendors, he said, were consulted in the development process to ensure that a wide spectrum of CASE tools will be available with the system. Libutti added that versions of the repository running at customer sites have also been the source of recommendations for changes.

IBM is a member of the ANSI Information Resource Dictionary System committee, which has laid out specifications for a standard repository. "As the standard evolves, we expect our standard to comply," an IBM spokesman said.

Tying it together

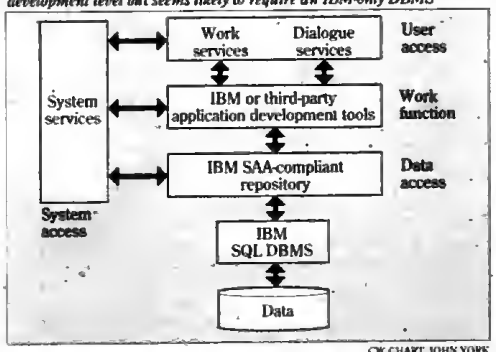
IBM's repository reportedly integrates a number of programming sequences



SOURCE: IBM
CW CHART: FRANK C. O'CONNELL

What one hand giveth . . .

IBM's repository concept will allow third-party software at the application development level but seems likely to require an IBM-only DBMS



CW CHART: JOHN YORK

Some win, some lose when repository debuts

BY STANLEY GIBSON
CW STAFF

Among independent software vendors, those that have the most to gain from IBM's repository are the host of small firms that deal exclusively in computer-aided software engineering (CASE) tools.

"We intend to have interfaces published and available for developers and independent software vendors," declared Robert Libutti, IBM programming systems director of market support.

By complying with IBM's guidelines, these vendors stand to go for a ride on the back of the "Blue whale." Their CASE tools will most likely be in demand because these products will generate applications that can run on any Systems Application Architecture (SAA) platform.

Conversely, their participation will help IBM establish the repository as a standard by making available a wealth of tools for every type of CASE user.

Although IBM will also sell its own CASE tools, few vendors expressed worry about the industry giant's presence in the market. "We don't have all the tools and never will," Libutti said.

Meanwhile, vendors of competing relational database management systems, such as Oracle Corp., Computer Associates International, Inc., Cincom Systems, Inc. and Cullinet Software, Inc., stand to lose more ground in the mainframe market as IBM establishes DB2 as a de facto standard.

The position of fourth-generation language vendors is ambiguous. Although IBM's fourth-generation language (4GL) Cross System Product (CSP) is undergoing a major overhaul, it will not be required to use the repository, Libutti said. By complying with the repository's published specifications, third-party 4GL vendors will be able to compete on an essentially equal footing with CSP.

However, the fact that IBM has told many that CSP is "strategic" leads some to guess that IBM might some day make CSP a requirement for the repository. IBM is working with Transform Logic, Inc. on a new version of CSP, currently referred to as IBM Application Generator, that will generate Cobol code. CSP does not now generate Cobol. The revamped CSP need not be announced at the same time as the repository, Libutti said. CASE tools vendors, including Arthur Andersen & Co. and Index Technology, Inc. plan to work with CSP.

Although IBM has considered establishing a certification laboratory to verify compliance with SAA in general and the repository in particular, IBM has rejected that idea. Instead, IBM will publish repository-compliance specifications and leave it up to independent vendors to meet them. Although vendors may claim SAA compliance in labeling, IBM will not underwrite that claim, Libutti said.

"If we viewed ourselves as in the repository business, this would be bad," said Glover Ferguson, director of development of Arthur Andersen & Co.'s Foundation CASE products.

He added, however, that his firm is content to sell tools. "There is no alternative to signing up with IBM," Ferguson said.

ANDY FREEBERG

IBM's Libutti: *'We don't have all the tools and never will'*

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TRENDS

Expert systems

Despite a reaction against artificial intelligence as a "hot" technology and AI's failure to live up to unrealistically high expectations, 1988 was a year of steady, if unspectacular, progress for the AI industry.

The march to greater use of expert systems continues as an inexorable underlying trend, according to a recent report issued by Cutter Information Corp., a publishing firm in Arlington, Mass.

Cutter estimated 1988 sales for the total AI market, including languages, tools, applications, training and hardware, at $422 million. That figure is several hundred million dollars below figures arrived at by other consulting groups, Cutter noted. The market is expected to grow by 58% in 1989 to a total of about $667 million, according to the firm.

The report also predicted the emergence of several market leaders to attain clear dominance, as smaller players fall away. Among the winners, the report said, will be companies such as Aion Corp., AI Corp., Information Builders, Inc. and Neuron Data, Inc., which should double their sales in 1989.

The emergence of these firms parallels the increased acceptance of AI in commercial markets. "The worst of the transition from R&D customers to MIS customers is over, and the shakeout is winding down," the study concluded.

Acceptance of AI has been hampered by the battle over hardware and software standards, which is still in progress. Choosing among MS-DOS, OS/2 and Unix, as well as opting for Apple Computer, Inc.'s Macintosh, Digital Equipment Corp.'s VAX or staying within the IBM world have all been major sticking points on the road to wider use of expert systems, according to the report.

The Cutter report makes several predictions for 1989, including the following:

- LISP machine vendors and LISP-based generic tools will all but disappear in 1989. LISP-based problem- or domain-specific tools will do better, but C, Macintosh and mainframe-specific tools will dominate the news in 1989.
- The hottest subject this year will be object-oriented techniques. All of the tool vendors are scrambling to introduce offerings or improve their current capabilities. Object-oriented techniques make developing expert systems faster and easier.
- Neuron Data's Nexpert Object will dominate the workstation tool market in 1989 but will probably start to face serious competition from offerings that have similar capabilities and interfaces but are less expensive.
- Consultants and vertical market value-added resellers will do very well because organizations will turn to them both for assistance in training and for developing costly tailored expert systems applications.
- The research community will continue to show strong interest in neural network technology, but commercial applications will lag.

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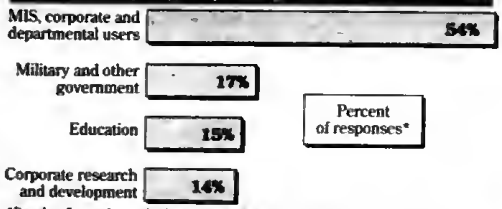
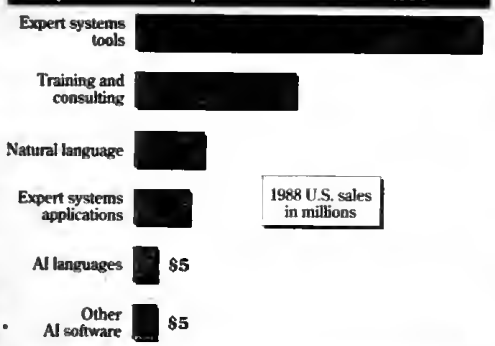
Who's buying expert systems?

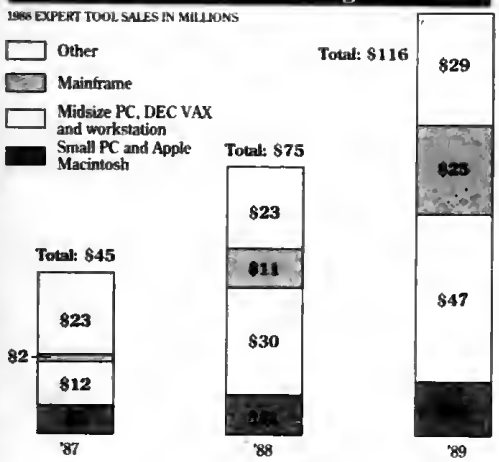


*Based on figures from a database of approximately 800 applications and a survey of 25 vendors and users who are building applications

Expert tools top AI software market



Mainframe tools see fastest growth



SOURCE: CUTTER INFORMATION CORP
CW CHARTS: JOHN YORK

INSIDE LINES

Don't call NTT. Cray Research is reportedly planning a major supercomputer announcement for early this week. Industry sources said the products might be related to the Cray Y-MP series. That's the computer line designed by Steve Chen, who left Cray to start Supercomputer Systems, Inc. in Eau Claire, Wis. We'll bet that the former NTT chairman (see story page 16) won't show up for this one.

There's smoke, but is there a fire smoldering? Novell denies it, but sources close to the firm claim it is being shopped like mad. One source said four prospective candidates nixed an offer to buy it for a whopping $1 billion.

The chain(saw) of command. Two weeks ago, we reported on Ken Olsen's message to DEC marketers that anyone hugging trees might find their shelter blown down. Now we hear that the company's latest system, the seemingly out-of-nowhere reduced instruction set computing-based Decsystem 3100, was riding those winds of change. According to sources at DEC, Olsen made the decision on the Thursday before Uniforum 1989, and after much scurrying around by DEC staffers, it was announced the following Monday. Meanwhile, the company is apparently cleaning out the warehouses and chopping prices on upgrades to the 8550 CPU by 50%. It is also slashing upgrades to the 8800 and 8350 by 20%.

Language lessons for PBXs. Information Builders will officially sign up as a participant in DEC and Northern Telecom's Computer Integrated Telephony program, as part of the partners' big announcement Tuesday. As a result, Northern Telecom private branch exchanges — and any other PBX that supports the program — will be able to use Information Builder's fourth-generation language, Focus, to access a variety of VAX database management systems.

Richard Milhous Nixon would be proud. Users are used to nondisclosure agreements that cover beta-tested PC software, but Gupta Technologies is pioneering ones that cover a finished product that people pay money to buy. If you want to buy the SQLbase server for OS/2, you must sign a legally binding agreement to use the product only for development and testing and not to disclose the results of such development or testing. Strictly speaking, a user could get sued for disclosing product glitches to publications like *Computerworld*; apparently, you can't even tell us what it is you are doing. Gupta claims it is trying to prevent Microsoft from using Gupta techniques in SQL Server.

'Sliver,' a new benchmark definition. Installing IBM's OSI FTAM file-transfer and CCITT X.400 electronic mail software on the same system means also installing two sets of OSI networking software underneath. The reason: IBM developed its FTAM product to work with its officially blessed OSI Communications Systems software, but the X.400 offering is a revamped version of a European product that uses a different version of the networking standard. IBM assured us the disparity will only last for "a sliver of time."

Yes, no and . . . maybe. Last week, rumors of significant delays in a new HFC tape line for Vaxclusters and an imminent unramping in the sales organization dogged the Milpitas, Calif.-based Systems Industries. The company's chief financial officer confirmed that, "we had hoped to make this product announcement earlier than we will be able to," but declared the company very close to a commercial rollout. Although he absolutely denied that any layoffs were planned, he added that Systems Industries is "looking at ways we can come out of the loss situation as quickly as possible, and one of them is cutting costs, which sometimes involves decreasing head count."

Now our hot line is not only hot, it's also on-line. You can interface with News Editor Pete Bartolik by tapping into our bulletin board at 508-626-0165. Just remember, the more information you provide, the easier it is for us to nail down the facts. Of course, if you prefer to make news the old-fashioned way, you can still call in to a human voice by dialing 800-343-6474 or 508-879-0700.

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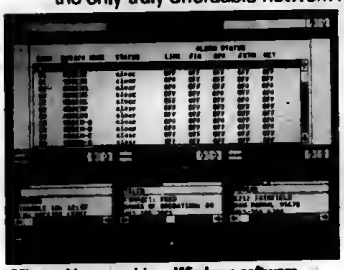

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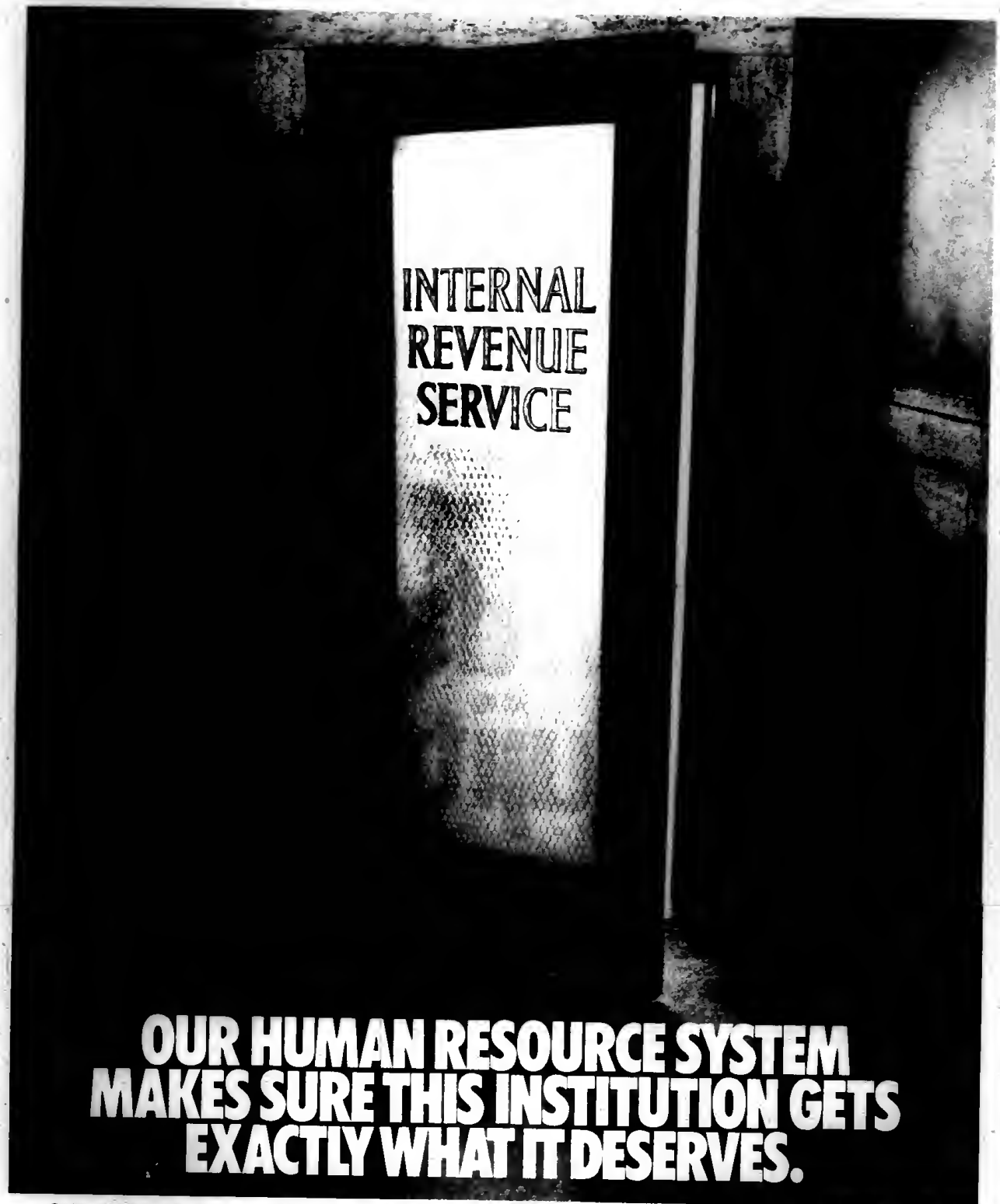

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